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The New Gas Plant, Societie Anonyme du Gaz de Rio Janeiro, Brazil.

[Prepared for the JOURNAL, by MR. L. J. CARDER.]

As one approaches the quay, at the left side of the Mangue Canal, and sees the enormous buildings, towers, chimneys, gasholder and other installations of the new gas works, rising above the encircling brick wall which follows the Caes, Mangue and Pedro Ivo avenues for a distance of perhaps two-thirds mile, one realizes the startling development which Rio de Janeiro has undergone in the last few years to make necessary the erection of such a gas plant. But it is only having entered the grounds, that the magnitude of the new works is appreciated. It is, in truth, a walled city, with streets and buildings, deposits of material, and here and there large areas held in reserve for the erection of future installations to satisfy the increasing demands for gas.

The Société Anonyme du Gaz has planned this gas works, not only to produce gas for the present, but to make possible the production of gas which will be required by the rapid growth of the capital.

It is interesting to remember that the entire gas works is built on "made land," and that only a few years ago the tide covered all this area, and as far back as the old Formosa shore. By virtue of its new contract with the Government, the Société took possession of this tract in the beginning of the year 1910, and immediately began to put in the foundations for the various heavy buildings and installations, using in all cases piles and reinforced concrete, made necessary by the unsettled character of the ground. Thousands of piles were driven, and many thousands cubic meters concrete, in order to construct foundations according to the most approved modern practice, and capable of supporting all the important installations and machinery without suffering the slightest settlement.

The Chief Engineer of the Company (Dr. H. B. Harrop) went to England, Germany and the United States to study the newest methods in all the largest gas works, and to select the most modern equipment for the proposed plant at Rio de Janeiro, so that every part of this works represents the last word in the field of gas industry, and causes it to be one of the most complete and modern gas works in the world.

The materials used in gas manufacture will be landed at the new quay, immediately fronting the works, and, after having passed through the different processes, will be sent into the city as gas, coke, briquettes, "creoline," tar-paints, and all the other sub products. The ships bringing coal from Europe and the United States will tie up at the quay, and a modern mechanical installation will unload the ships and carry out the material to the works without the intervention of as much as a shovel or any sort of hand labor; 185,000 tons of coal may be stored in the works within the reach of the coal handling plant, and is then raised by machinery and delivered to the retorts as needed.

As the coal is delivered into the retort house it is accurately weighed and broken to a suitable degree of fineness, then is lifted (all by automatic machinery) into the bins, high in the houses covering the generating apparatus from the weather. The coal charging operation is beautiful in its simplicity and cleanliness, and anyone who has seen "firemen" working in old gas plants would be surprised to note how the present day workmen go along with so little personal discomfort.

The coal having been carbonized and converted into gas and coke, the men open the bottom doors of the retorts, allowing the hot coke to drop out into a conveyor, which carries it through cooling sprays of water and leaves it in an elevated bin from which it can be drawn as needed by gravity. All of the machinery in this installation is actuated by electricity, and as the roof covering is high and well ventilated, the insufferable heat under the old system is not experienced. The entire construction is of concrete, brick and steel, so that perfect cleanliness can be maintained. The system is the latest method of producing gas from coal, and the Rio plant is the largest example that has yet been constructed in any country (July, 1911).

From the retort house runs an elevated foul main meter (39.37 inches) in diameter, having condensing apparatus, from which the exhausters drive or pull the gas through the most modern condensing and scrubbing apparatus.

The condenser system embraces various devices for retaining tar, ammonia, etc. Some of these tanks are carried on a steel tower at an elevation sufficiently high to distribute the liquids to all parts of the plant. In the base of the tower are the pumps for handling water, tar and ammonia, all in duplicate, so that in case of any disarrangement, another apparatus is always ready to take up the work. In a building next the tower is an installation of 4 boilers of large capacity for furnishing steam to the various processes of manufacture, etc. In the boiler house space is reserved for doubling the steam plant. The boiler house stack is the highest chimney structure in Rio.

In addition to the installation for coal gas, apparatus as an example of the most modern type of water gas making was installed. A part of this installation comprises 5 large tanks for the storage of oil, capable of retaining sufficient oil to last one year.

Leaving the condenser installation, the gas passes to the station meters and then to the holders, the main being directly in front of the Lazaros Hospital.

The works are equipped with a special form of apparatus for preparing coke in various sizes for distribution throughout the city, such distribution being made by means of electric automobiles to all parts of the city. Provision is also made for a plant for manufacturing briquettes. These sub-products will hereafter be utilized and supplied to the local market, as is done from the gas works in foreign countries.

A large steam electric station is being erected which is rated to produce enough power to guarantee an electric illumination of the city in case of unforeseen accident, A special building has been set aside for the comfort of the employees, which is provided with all sanitary requirements, even to hot and cold baths.

The Company's new office headquarters and display room are located in the heart of the city, and here is kept on display everything necessary for the modern and economical use of gas in the house or on the street.

The initial official test of this immense plant, of which the foregoing is a brief description, was largely attended. Dr. J. J. Seabra, Minister of Industry; General Bento Ribeiro, Governor of the Federal District; Otto de Alencar, Inspector of Illumination, and various other notables, Engineers of the Gas Company and representatives of the press were present and inspected all parts of the plant.

Dr. J. J. Seabra (in the absence of Marshall Hermes, President of Brazil, who was not able to be present) closed the switch which set all the machinery in the works in motion. In the presence of the inspecting party retorts were charged and discharged, and all the moving machinery tested and demonstrated. The test having ended, to the complete satisfaction of the Government officials, the management of the Société Anonyme du Gaz entertained their guests in royal style. And all of this marks great steps in the rapid progress of Rio de Janeiro.

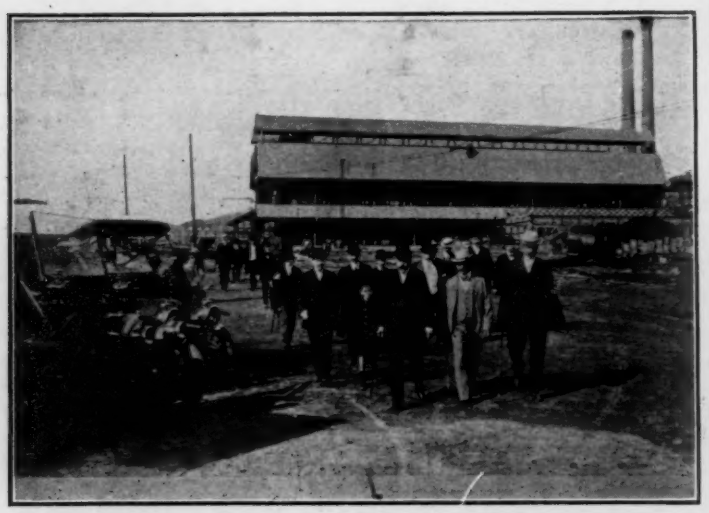

Fig. A.—Minister of Industry, Governor of Federal District, Inspector of Public Illumination, Chief Engineer of Gas Company.

The foregoing is an extract from an article published by *A Imprensa* (*The Press*), June 24, 1911, a daily paper of Rio de Janeiro, Brazil, descriptive of the inauguration of the new gas plant built by the Société Anonyme du Gaz, one of the subsidiary Companies of the Rio Janeiro Tramway, Light and Power Company, to supply gas for public and private consumption in Rio, a city of about 1,000,000 inhabitants.

The R. J. T. L. and P. Company is one of a group of public utility companies, operating in foreign countries, controlled by Dr. F. S. Pearson, of New York city, London, England, Toronto, Canada, etc. During the past 7 years the Company has built and is operating a hydro-electric plant of 40,000-horse power, up country from Rio, with 80 kilometers (56 miles) of transmission lines to bring power into the city, where it is converted, in the main station, into high and low tension, alternating current, for power and light, and direct current for tramways. The Company has installed a complete underground electric distribution system, sub-stations, rotary converters, etc.; has consolidated, rebuilt, electrified and extended all the street railways, so that the city is adequately served to the remotest districts, and has reinstated and reequipped the telephone system throughout, etc. A

Fig. B. Various Officials of the Government and the Gas Company.

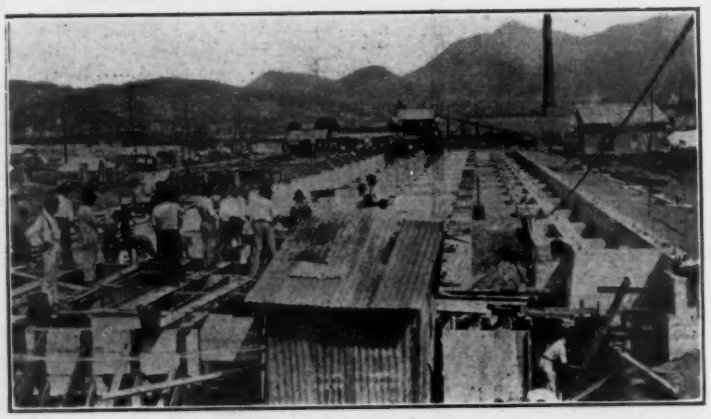

Fig 1.—The Foundations of Retort House.

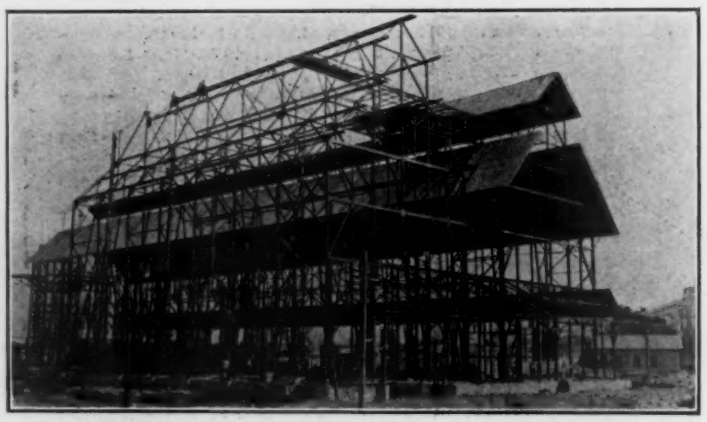

Fig 2.—Steel Work of Retort House Nearly Finished.

glance at a map of Rio and environments will convey some idea of the magnitude of this undertaking, planned and carried to completion by American engineers under difficult conditions, intensified in many features by the nature and topography of the country, unfamiliar language, ways and customs, and distance from source of supplies.

The construction work in general, as well as operation, has been and is now under the able and efficient direction of Mr. F. A. Huntress, General Manager, formerly of Worcester, Mass., Halifax, N. S., etc., who, in addition to the qualities essential to the successful conduct of so large an enterprise, possesses, in an unusual degree, the faculty of inspiring *esprit du corps* among the subordinate officers and engineers of the Company.

The latest, but not by any means least, of the Company's re-habilitation projects is that of the gas plant (manufacture and distribution) completed in July of last year. The old gas works, originally of English construction, of the "vintage" of about 1850, augmented through the last half-century, as conditions demanded, in diverse styles of sacred and profane gas works architecture and design, was a decrepit and lottering ruin, totally inadequate to the necessities of

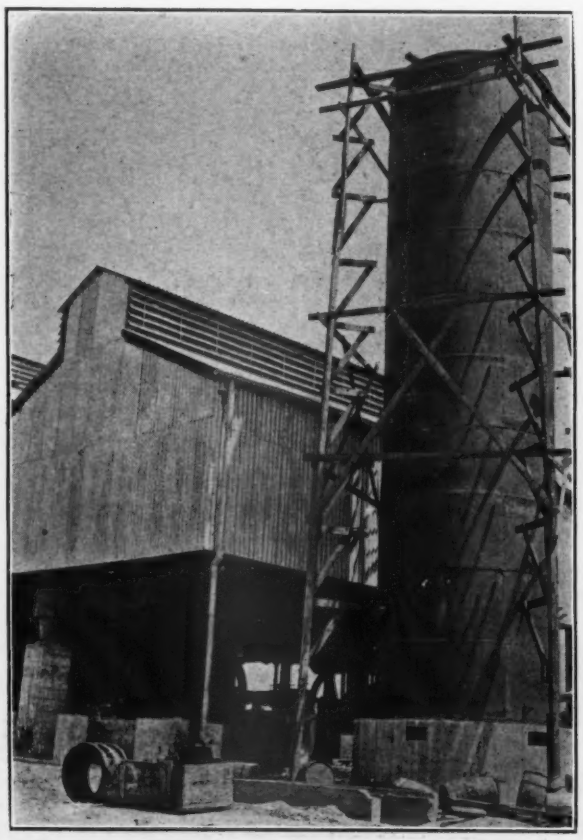

Fig. 3.—The Atmospheric Condenser.

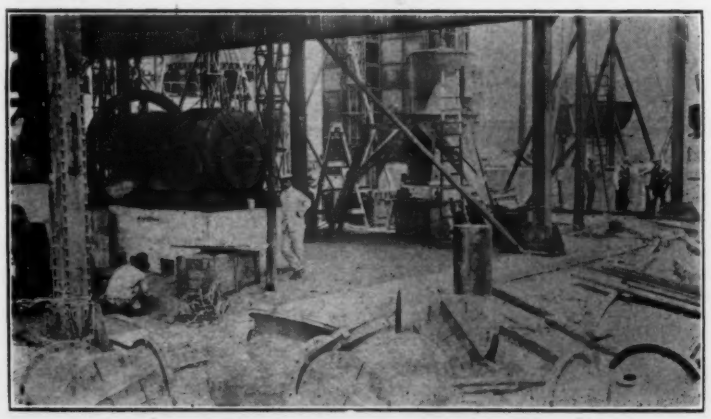

Fig. 4.—The Exhausters and Tar Extractors.

Fig. 5.—The Reutter Condensers.

a great and growing city. Now, that its painful activities are over. it might be classified as a picturesque antique, a pilgrim's shrine fo the coming gas generations; but during the years it has been neces sary to keep its archaic anatomy "funceonating," its romantic aspec was somewhat obscured, so to speak, by a sort of nightmare of work,

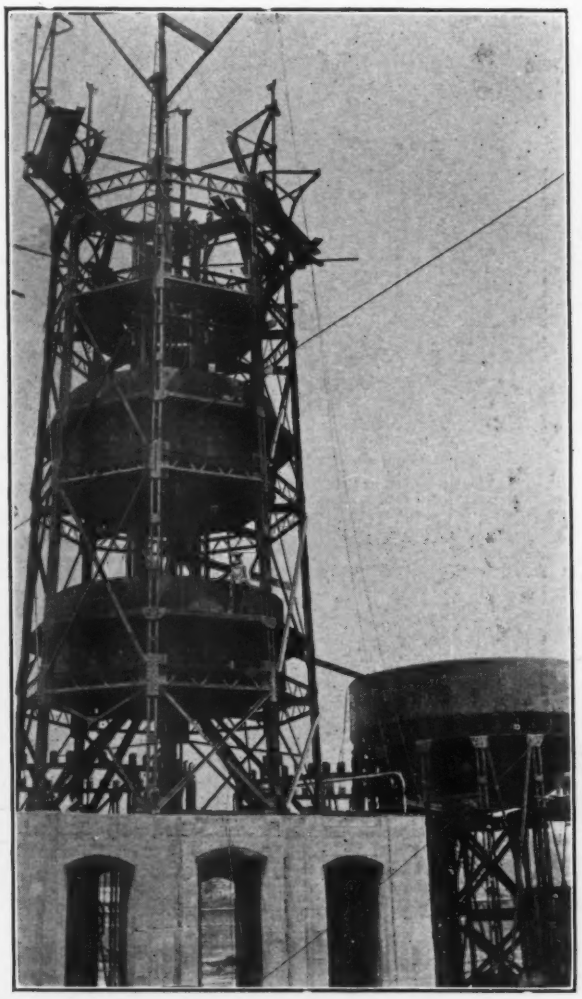

Fig. 6.—Ammonia Tower and Water Tower.

Fig. 7. The Purifiers, Partially Built.

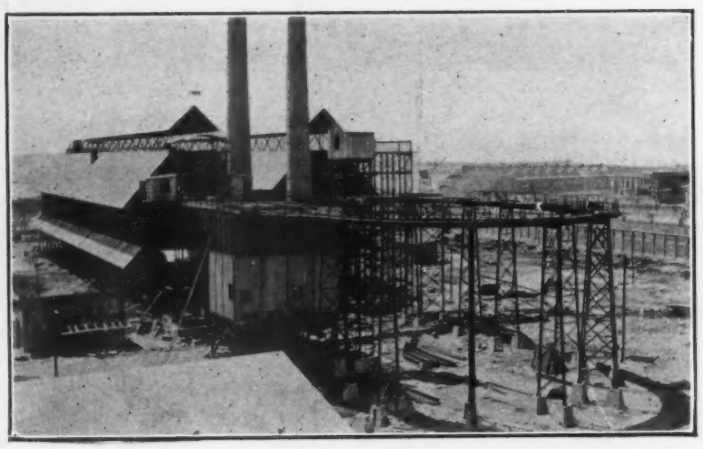

Fig. 8.—The Coke Conveying Plant.

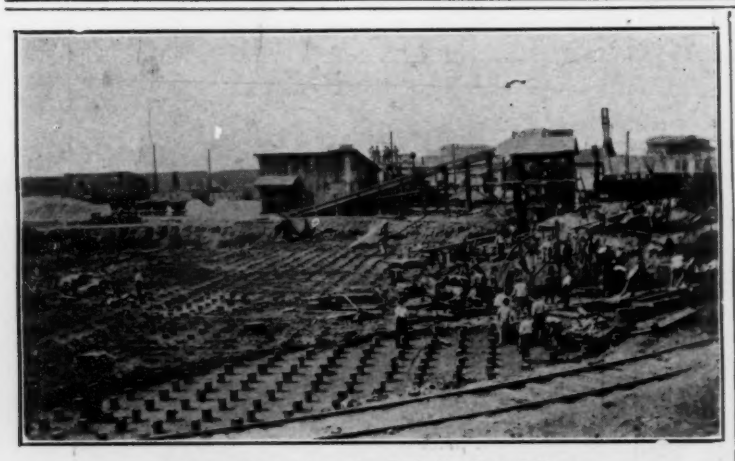

Fig. 9.—Piles Driven for Gasholder Foundation.

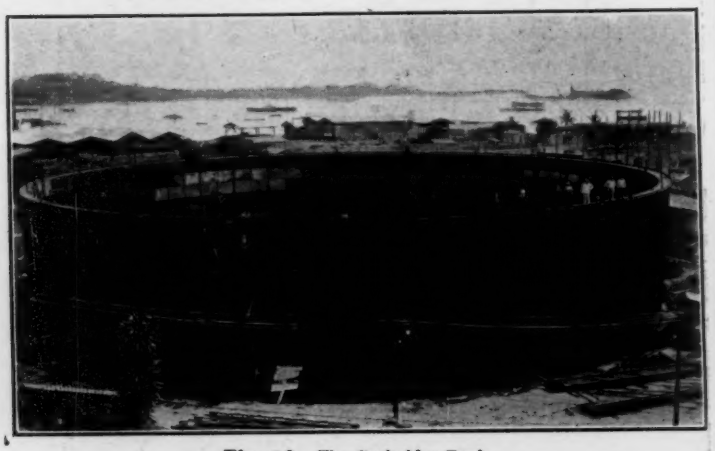

Fig. 10.—The Gasholder Tank.

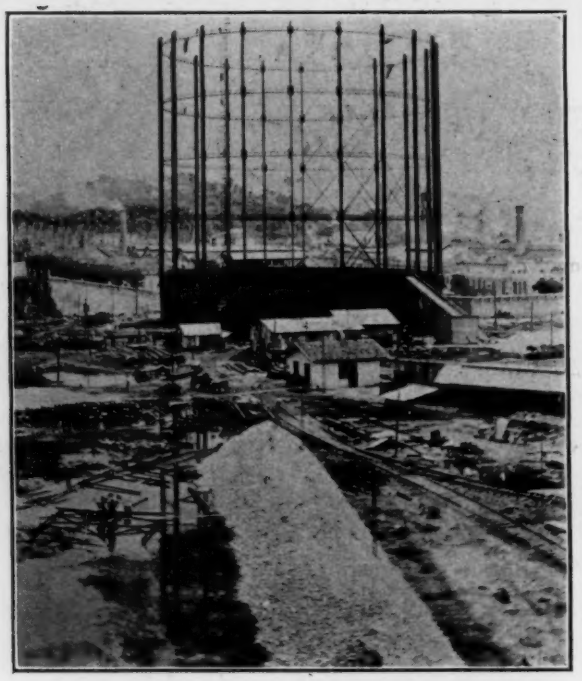

Fig. 11 —Gasholder Tank and Guide Frame.

worry, profanity and chronic sleeplessness, enjoyed by those who were responsible for its operation. "*Requiescat in pace.*"

The old plant has been operated, and the new plant built, under the direct supervision of Dr. H. B. Harrop (formerly of Milwaukee, Wis.), Chief Engineer of the Société Anonyme du Gaz. The Assistant Engineers are: The writer, formerly of Brooklyn (N. Y.) Borough Gas Company; H. A. Church, formerly in the New York office of Dr. Pearson; and W. E. Watson, also formerly of Brooklyn Borough Gas Company. Great credit is due to Dr. Harrop for the untiring energy, unfailing resourcefulness and marked ability with which he directed a very arduous undertaking.

The reporter of the *Imprensa*, whose article introduces this mention, naturally only saw and depicted the picturesque or "news" aspect of the plant and the visit of high governmental officials at the function of inauguration. Evidently, he is a lover of sonorous phrases and glittering generalities. Therefore the following is a brief description of the new manufacturing plant and its distribution system, which will possibly have interest for the fraternity.

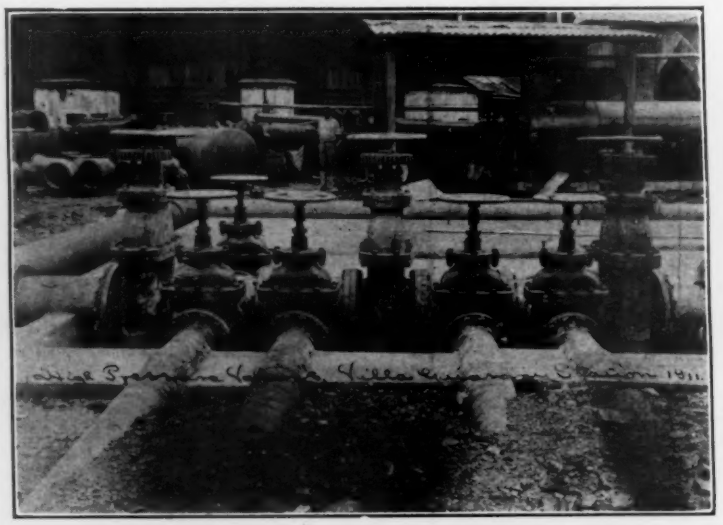

Fig. 12.—An 18-Inch Valve Header of 10-Inch High Pressure Mains at a Holder Station.

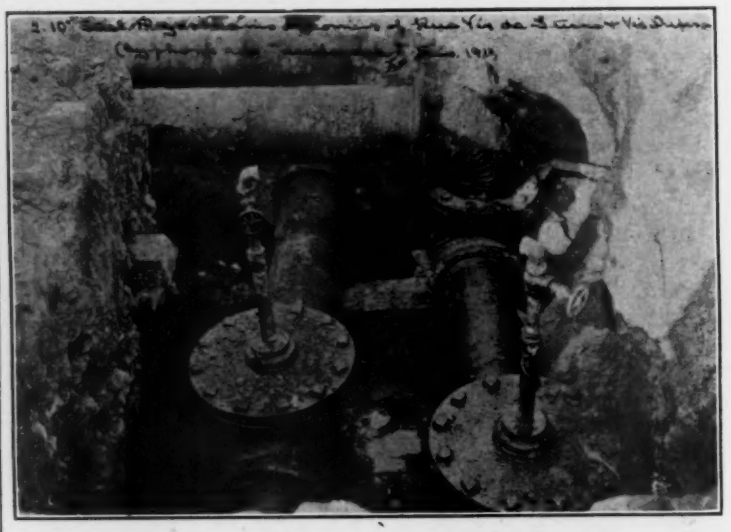

Fig. 13.—A 90-Degree Connection of 10-Inch High Pressure Main, Showing Line Drips.

Fig. 14.—Re-covering Steel Pipes with Jute Cloth and Hot Asphalt.

All foundations were built by the Company, under the supervision of Mr. W. G. McConnell, Chief of Construction of the R. J. T. L. and P. Company. Retort house, condensers, purifiers, holders, water gas, ammonia and tar plants were erected by the well-known German constructors, the Stettiner Chamotte Fabrik Actien Gesselschaft and the Berlin Anhaltische Machinenbau Actien Gessellschaft, the latter better known as the "Bamag Company." The coal handling plant is by the Mead-Morrison Mfg. Company, of Boston, Mass., and oil tanks, etc., by the Riter-Conley Mfg. Company, of Pittsburgh, Pa.

Fig. 15.—Laying Steel Mains in a Typical Rio Street.

Fig. 16.- Laying Steel Mains along the Mangue Canal.

The retort house is of the latest type of Dessau verticals, comprising 4 batteries of 7 benches of ten 5-meter retorts, or 280 of the latter, equal (with steaming) to a total capacity of 120,000 cubic meters (4,200,000 cubic feet) per day of 24 hours, constituting the largest single installation of this type in the world. The water gas plant has a total daily capacity of 80,000 cubic meters (2,800,000 cubic feet) which, added to the coal gas make, brings the maximum daily output to 200,000 cubic meters (about 7,000,000 cubic feet), which is nearly double the present daily output.

Coal will be handled mechanically throughout, from the ship to the retort. Coke conveying and handling machinery, also entirely automatic, is of the accepted type for verticals. The principal consideration towards selecting the vertical type, was the necessity of eliminating hand labor as far as possible. The other apparatus includes:

Primary and secondary condensers, tar extractors, exhausters, tower-scrubbers, washers, etc., complete for handling 200,000 cubic meters per day. There are four double-deck, cylindrical purifiers, equipped with side-charging and discharging doors. and built in the open, according to design of Dr. Harrop, to meet varied conditions peculiar to Rio.

The new 4-lift holder has a capacity of 3,000,000 cubic feet, which, added to the existing outlying holder capacity, in the city, will give a total storage of 5,000,000 cubic feet. The ground space is, of course, laid out for extensions in all directions.

The new distribution system was more particularly the work of the writer, who designed and built it to remedy diseases that afflicted the old street main systems, of the same degree of senility, and of the same measure of cussedness, as those which disaffected the manufacturing plant. The new system may properly be called high pressure transmission.

The entire daily output will be handled by motor-driven compressors, divided into 3 units, each of 200,000 cubic feet hourly capacity. One, two or three units may be employed to compress to any pressure between 10 pounds and 30 pounds, that is found to be the economical one for any volumetric condition between low consumption hours and peak load.

Gas is delivered into a system of high pressure mains, radiating to main distributing points in the city, and bi-secting the old low pressure feeders, into which gas is discharged at consumers' pressure through Reynolds district governors. These high pressure arteries, by means of Reynolds line regulators, deliver gas at 1 pound to 5 pounds pressure into the old transmission trunk system between the old works and outlying holders, thus employing the latter as a subsidiary pressure system, which in turn is also connected into consumers' mains at various points with regulators. Also, by means of small diameter branch lines, any low pressure city area can be reinforced. Holders are connected to the subsidiary pressure mains by regulators operating automatically.

Future urban and suburban growth of consumption will be met by extensions of the high pressure mains to new centers of distribution, the installation of high pressure tanks "in circuit" with the lines, with automatic regulator control at holder stations, dead ends or other advantageous points in the territory supplied, affording, when necessary, increased initial pressure at the station, and, finally, second-staging gas at outlying stations to 80 pounds to 100 pounds pressure for storage.

The high pressure pipes are Stewart & Lloyd's inserted joint pipe and Mannesmann weldless steel tubes throughout, in 20 to 33-foot lengths, bell and spigot, with lead wool joints, specially constructed drips at all low points, cast steel, bell and spigot and flange specials, and flanged high pressure valves, all pipe and fittings being recovered on the job, before laying, with jute cloth and hot asphalt, all bottle-tight at 100 pounds pressure.

Thus, as a whole, the combined manufacturing and distributing plants provide great flexibility of operation and permit of indefinite extension.

[Continued from Page 21.]

PROCEEDINGS, SIXTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

Held in St. Louis, Mo., October 18 to 20, 1911.

First Day—Afternoon Session.

Discussing the Dutton Paper[1] on Commercial Motor Delivery, etc.

The President thought some of the members knew something of the subject, and all should be anxious to find out. He would not call o anyone in particular, but should like to hear a full discussion.

Mr. W. Forstall said he was very much interested in motor traction for some 3 or 4 years. Two years ago it was forced upon their attention, because they were obliged either to build a horso stable or a garage. What they actually did was to build a temporary horse stable that could be converted into a garage. They operated in Philadelphia through 6 different districts, and 1 district was converted from horse to electric wagons. They had now been running in that district about 2 years, and were well satisfied indeed with the service. They are not absolutely certain just what their saving was, as compared with horses, because that bugaboo of a depreciation question could not be settled until they had had the wagons in use for much longer than 2 years. They were actually figuring on a 10 per cent. depreciation, and would use that figure until they found it was either too little or too much; but it seemed safe at present that they operated with the electrics for at least 75 per cent.—perhaps a little bit less—of their horse cost. They recently changed over another one of their districts, so that now in Philadelphia they had about $60,000 invested in electric vehicles. which showed they had some faith in this service. To give them an idea of what it meant in a city the size of Philadelphia in their distribution department, they had 105 horses, 57 meter wagons, of which 8 were electric, 2 meter vans, horse driven, to carry meters from main meter house to the district shops; 16 main and service wagons, general delivery wagons for main and service material, of the open express type, of which 4 are electric; 5 lamp wagons, which carry around incandescent material, arc lamps and lights, one of them being electric. They had 18 pipe trucks, which are horse-driven; 16 stove wagons, carrying stoves and stove connecting material, one of which is electric; 6 hauling wagons, 2 dump wagons, 5 drip wagons, 2 leak wagons, 1 paving wagon,3 carts, 295 bicycles, 49 motor cycles and 25 motor cycle vans. Their ultimate hope was to have all wagons power driven. Whether they would be all electric

1. For the text of the paper, see *ante*, page 21.

or all gasoline, or part electric and part gasoline, was uncertain, but he rather thought it would be most electric and part gasoline, because they had a certain service where the mileage was probably beyond that economically possible with an electric wagon. He had made a few notes on Mr. Dutton's paper. That gentleman spoke of the motor truck taking half the storage space of a horse wagon. They now had a stable with a capacity for 80 horses. In a few years they might be forced out of a neighboring district shop. In that case, their present plan was to turn the stable into a garage for electric wagons, which would enable them to use for the district shop the entire second floor of the stable. On a named page was shown "Time out of service for repairs." They bought certain extra parts, such as wheels and chains, and, in two years of electric service, in a district looking after 60,000 meters, on a quite exacting schedule, there had never been a time when they had to call on horses for aid. The electrics have always been on the job. The electrics are also very largely independent of inexperienced drivers. They took the drivers that they had on the horse wagons, and it took them but a short time to learn how to run the wagon, and they have had no accidents. Mr. Dutton spoke of motor cycles and also motor cycle vans. Their experience with vans had been very much that of learners. They bought the best there was on the market, charged 50 per cent. depreciation against them, and he didn't believe that was quite enough. [Laughter.] Two makers of motor cycle vans that he knew of were getting out what promised to be a much better type than they have had; a better model. One of these was shown, and one model had not yet come out of the factory. He didn't know what the model shown on page 14 cost, but he rather thought it cost a little more than a new type of runabout that is on the market. They bought one of the latter. If they could buy a 4-wheel runabout, on the back of which they could put a box containing a lot of incandescent material (for the conveyance of which they used these motor cycle vans), for anything like the price of a 3-wheel van, they would prefer the runabout. They expected to get more work out of the runabout, and if it proved satisfactory they would never go back to the 3-wheel van, unless indeed the price became much cheaper than the runabout. He thought the 4-wheel runabout costs $350, and that they paid about $260 for the 3-wheel vans. He was interested in the worm-drive, shown on page 27. Some months ago they ordered a 2,000-pound electric wagon, expecting to get a worm-drive, but just at that time the makers decided to abandon the use of a worm-drive for that size of wagon, confining it only to wagons of less capacity. In view of this fact, and also that the worm-drive had been given up by the Company having the longest experience in the building of electric wagons, they were awaiting with quite a little interest to see whether that form of transmission was satisfactory with a gasoline wagon. On another page Mr. Dutton spoke about the difference in the treatment of depreciation. The situation as he saw it was, as a rule, that although using horses you wanted your people to buy motor wagons, and they wanted to know what it is going to cost. Until they knew more about depreciation it seemed to him that 10 per cent. was the least one can charge against an electric wagon, and 20 per cent. against a gasoline wagon. Of course, as soon as one is sure that any arbitrary charge of depreciation was larger than required, one should at once get the figure down to what experience seemed to indicate as proper. Mr. Dutton says it was generally conceded that a well-built vehicle was good for 7 years, or about 60,000 miles. The trouble so far has been to discover the *well-built* vehicle. Their experience with pleasure vehicles had certainly been that the same make varied from year-to-year. When they found a well-built vehicle they expected to stick to it. As to deciding on the wagon needed. That was a very important point. One should be very careful before buying to be sure one was getting a large enough wagon. In every case one would find that where power succeeds horse traction, one was able to carry heavier loads. They started out with a 2,000-pound wagon for both meter and service work, and at once found that the 2,000-pound service wagons were being sent out with more than 4,000-pound load, and that any smaller load would not be economical. Of course, such overloading of the 2,000-pound wagon would in time seriously affect both its springs and its tires. Fortunately, their business grew quickly, requiring additional wagons, so they were able to change their 2,000-pound service wagons into meter wagons, buying 4,000-pound wagons for service work. They found for 2 years that 2,000 pounds for meter work and 4,000 pounds for service work was ideal for their conditions.

Mr. Searle said as an automobile manufacturer, they had a paper here that all the automobile engineers and all the automobile manufacturers had never been able to get from the industry. It took the American Gas Institute to produce a gas man to show the automobile man how to get up a series of articles and the series of statistics honestly compiled to make possible the needed style of truck. It was unique and nevertheless mortifying to him as a manufacturer of automobiles. In Rochester the problem confronting them was a steadily increasing cost of horse distribution. It became necessary to consider a system of outlying shops. The superintendent made a study of the matter and put different colored pins, in a map showing the various types of distribution, new meters, stations' plants, etc., and those colored pins illustrated that they had reached the saturation point in certain characteristics of their demand inside the 2 mile circle, so that 90 per cent. of their work was being done outside it. Outside the 2 mile circle it was necessary to have auto delivery. A most interesting thing was in connection with transporting their Italian laborers. The men working in that section go to work in the big trucks, and are physically able to do a day's full work. They return in them at night. Between times the trucks are engaged in routine work. The transportation service had been doubled in returns virtually by means of automobiles. The economy problem in auto operation was largely of the personal sort. Now they had one man keep watch of the ways of the 50 or more chauffeurs employed, with the result that maintenance costs had been cut in half, and that the men really showed a competitive spirit in their work. He was surprised to hear at a meeting of their Chauffeur's Club (for such a club was maintained) several say—in fact, a resolution to such effect was passed—that the hints given them at their meetings had enabled them to operate the machines more efficiently all round. Having had 60 horses, these now numbered 16, and in their places 34 automobiles were doing the work. Another matter which hampered them greatly in Rochester was the matter of winter delivery. A snowfall obliged them in former times to use sleighs, now the autos seem to pack the snow, and go over it all right from the start. Last winter, which was marked by a heavy snowfall, the service was carried on satisfactorily, the vehicles seeming to pack the snow. In fact, the autos worked when their horse drawn vehicles would not have worked. As to overloads, Mr. Dutton shows a cut illustrating a 2 ton gasoline truck of well-known design; a second shows a 2-ton truck designed by an "automobile engineer." The first shows a worm-driven machine of 2 tons having 99 per cent. of its load on the back axles; the other had 84 per cent. distributed on the 2 axles. Figured out, the efficiency of the latter would be 75 per cent. lower than that of the former, from every point. This showed the absolute necessity of knowing what to buy to respond to the conditions properly. The electric vehicle should be studied from two standpoints, the prominent one being that of reliability. With an electric truck this would, out of a possible 300 working days, guarantee an actual working time of 290 days, whereas, with a gasoline truck the guarantee was 225 days. Mr. Forstall points, as to having duplicate parts, were of great moment. As to overloading a vehicle, the question was a most serious one. Putting an automobile in the hands of the average man, as a beginner, he noticed that when such men had attended a test for speed at a fair grounds, the amateur began to act as a maniac in the speed instance. Leaving the fair grounds returning home they all tried to run the speed to 60 miles. Every time a chauffeur passed another, or even when he passed the driver of a horse team, both the "passed" ones immediately "hit it up." Then, in a 1-ton vehicle, a 2-ton load will often be carried. One or more of small overloads will put the vehicle out of business for quite a while. With common care the life of a truck is largely extended. The Rochester Carting Company have in use 2 electric trucks of the General Vehicle type, built in 1900, that are still in service in first-class condition, and they had averaged about 30 miles per day. As to depreciation, the author was quite right, if through repairs, a truck was kept in first-class condition for 10 years, and at the end of that period none of the original truck were left, one has had no depreciation, paradoxical as that might seem. The final item is the driver, also his pay. They earned theoretically 3 times that earned before by the driver of horses, and a further secret of getting full capacity of a truck was the selecting of the men that would load and unload it. They had talked about cost per mile, but the real thing should be the cost per ton-mile, as in railroad practice.

Mr. Norris said a very important phase of this question was, especially in respect of mobility, the necessitating of having the parts of the apparatus interchangeable. Then came the importance of sleeving all working parts. Outside of their Philadelphia equipment the U. G. I. Company maintained 15 to 20 cars used by superintendents,

ranging in original price from $900 to $4,000. The average maintenance cost, exclusive of depreciation, was slight. As to overloading, he asked if it were practicable to use the springs as a sort of platform scales? Could not some sort of movable adjustable scale be mounted on the rear axle which would indicate approximately the car load. The scale could be checked and reset from time-to-time. Such scheme would fairly guide the car operator in his knowledge of the right state of the load. He believed that the governor on a motor truck was an essential part of the equipment of a car. It should be so designed that it will prevent the engine attaining a higher speed when on the intermediate and low gears than on the direct drive. Hill climbing at injudicious speeding deadens an engine and racks the car. The question of 2-cycle *v.* 4-cycle motors was rather controversial, but his personal experience indicated that a 2-cycle engine, properly designed, was efficient and practical as a motor, and was without many of the disadvantages charged for by its opponents. It might have defects, but none of these were serious.

Mr. Dutton in closing the discussion, remarked that, as to the ap pointment of a committee to carry on work of the nature tried by the speaker, he said it would be difficult to get information regarding competing cars for the year. Reports received by companies showed great lack of uniformity in the keeping accounts, depreciation costs would be mixed up with operating costs, and *vise versa*. The committee would do a wise thing in formulating a basis for reports. Referring to Mr. Searle's remarks respecting the 2-ton trucks mentioned, he thoroughly agreed with that gentleman that the design shown in Fig. 8 would develop weakness through the placing of the rear wheels under the center of the body. He, however, wished to do justice to its designer by stating the truck was originally designed as for 1½ tons only. The point should be noted, in comparing these two trucks, that absolutely no trouble had arisen in the Fig. 8 truck, whereas trouble had developed in construction of truck shown in Fig. 7. Referring to the paragraph, "It should be noted in connection with this truck that a common fault was found in installing tires under capacity on the rear wheels. The wheels were also too light for the load owing to the overhang of pipe carried in the rear of the truck." That brought up the question of overload and location of same. He would particularly emphasize the importance of having trucks designed for the service required of them. Mr. Norris suggestion as to standardization was of the utmost importance, and since his paper was written, he understood that the standardization committee of the Automobile Engineers had submitted standardizing tables on electric lighting equipments now being placed in the 1912 models of touring cars. Further, they had selected during the past few weeks standards for iron flanges, sizes of bolts, number of bolt holes, etc., to be used on the rims for solid tires on commercial trucks.

The President said he took upon himself to tender to Mr. Dutton the hearty thanks of the Institute for his excellent paper. [Great Applause.]

(To be Continued.)

(Continued from page 26.)

Insulation as a Means of Minimizing Electrolysis in Underground Pipes.

[Prepared for the Sixth Meeting, American Gas Institute, by DR. E. B. ROSA and MR. BURTON MCCOLLUM.]

In Table V. is shown a series of current measurements on lines having insulating joints under conditions where, in most cases, it was not possible to obtain similar readings on lines not so insulated, and they are presented here merely to show that in general these currents have been found to be very low. These figures may be regarded as typical of what may be expected under ordinary conditions where considerable numbers of insulating joinis are used. That the current in these systems were not invariably small, however, is shown in Table VI., which gives a number of tests showing currents of considerable magnitude flowing in the pipes. It is to be noted, however, that in all such cases the insulating joints were widely separated, as shown by the column giving the distance from the nearest insulating joint to the point at which the measurements were taken. The distance between joints being at least double these values, they range, therefore, from 400 to several thousand feet. These figures simply emphasize the fact pointed out above that, if the joints are placed too far apart in places where potential gradients in the earth are high, dangerous currents may be taken up by the pipes.

In all of these cases above referred to the resistance joints were either spaced at considerable distance apart, or were not carefully made so as to insure a high resistance, and they do not, therefore, show what may be accomplished by the use of insulating joints when installed at very frequent intervals, and when proper care is taken to eliminate defects in the joints. In order to secure further and more exact data on this point two experimental lines of 4 inch cast iron pipe were laid at the Bureau of Standards, under conditions which insured identical conditions except for the joints. The lines were laid parallel, 100 feet long, and 40 feet apart, one line being provided with ordinary lead joints, the other with carefully made cement joints. The arrangements of these pipes is shown in Fig. 5. At the center of each line the pipes were separated by a large insulating plate and, to the ends of the pipes adjoining this plate, insulated leads were attached, which were brought to the surface and short circuited, an ammeter being inserted in these leads when it was desired to measure the current in the pipes. A difference of potential of 15 volt was impressed on the pipes and measurements of the current flowing in the pipes were made. The data are given in Table VII. The results are most striking illustrations of the effect of carefully installed insulating joints in keeping currents off the pipes. It will be seen that the currents flowing in the line provided with cement joints is at present less than one $\frac{2}{1000}$ part of that flowing in the line having lead joints and is decreasing. This current is so small as to be entirely negligible in so far as electrolysis effects are concerned.

TABLE VII.—*Current in Parallel Cement and Leadite Lines.*

Date.	Voltage.	Current Amp. Cement.	Current Amp. Lead.	Ratio L/C.
May 8.....	13	0.0032	29.1	9,100
Nov. 2	15	0.0011	24.2	22,000

It is very important to note that, in the system mentioned above, not only have the currents in the pipes been reduced to relatively small values, by means of insulating joints, but the systems thus protected have been singularly free from electrolysis troubles since the joints were installed. Although they have been in service for periods varying from 2 to 10 years or longer, no serious cases of trouble have arisen, although in some instances other systems laid in the same streets, and not so protected, have suffered considerable damage from electrolysis. Very significant in this connection also is the experience of the Cambridge (Mass.) Gas Company, which uses cement joints exclusively in its gas mains, and it has have had no appreciable trouble from electrolysis, while the water pipes occupying the same region and not so protected have suffered severely for years.

While the foregoing shows that insulating or resistance joints, when properly installed and used in sufficient number, will very greatly reduce the flow of current in pipes, there are certain features

(*Continued on page 42.*)

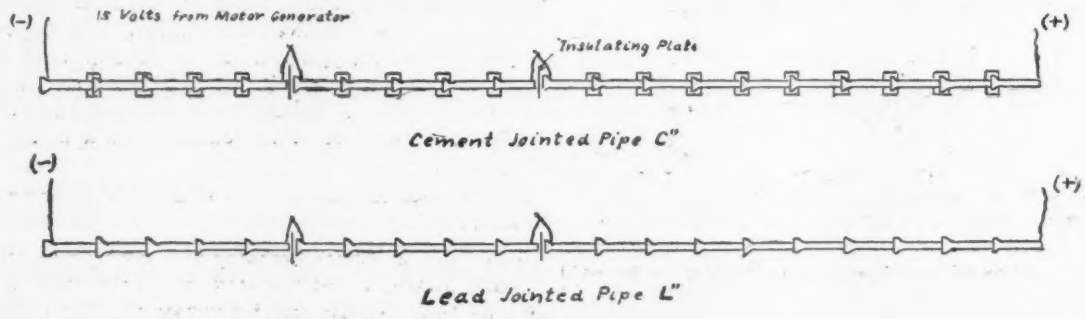

Fig. 5

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NOTICE TO ADVERTISERS.

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NEW YORK, MONDAY, JANUARY 15, 1912.

[Official Notice.]

Annual Meeting, Indiana Gas Association.

Indiana Gas Association,
Office of the Secretary,
Indianapolis, Ind., Dec. 28, 1910.

The annual meeting of the Indiana Gas Association will be held in the Claypool Hotel, Indianapolis, on Wednesday, January 17th and Thursday, the 18th 1912. The sessions will begin promptly each day at 10 A.M.

The list of papers to be contributed and discussed is as follows:

Report of Progress on "The Relation of Heating Value to Candle Power in Commercial Water and Coal Gas," by Dr. A. B. Davis.

"Securing New Business and Increasing the Sale of Gas per Meter in Small Cities," by Mr. H. Kaufman.

"Calorimetry," with a short talk on "Surface Combustion," by Dr. S. W. Parr, Professor of Applied Chemistry of the University of Illinois.

"Artificial Gas in Natural Gas Territory," by Mr. T. A. Elder.

"The Value of Industrial Business and Means of Securing It," by Mr. G. W. McKee.

"The Natural Laws of Gases," by Dr. A. B. Davis.

"Reminiscences of the Early Days of Gas Business in Indiana," by Mr. I. W. Wallace.

The Executive Committee has arranged for an informal dinner, on Wednesday evening, the 17th inst., at 6 P.M., the purpose of the dinner to be social and convivial enjoyment and exchange of ideas among the members of the Association.

For the information of the manufacturers, we may say there will be no exhibit of gas appliances at this "convention."

Respectfully, Philmer Eves, Sec'y.

[Official Notice.]

Forty-Second Meeting, New England Association of Gas Engineers.

New England Association of Gas Engineers,
Office of the Secretary,
East Boston, Mass., Jan. 1, 1912.

The Forty-Second Annual Meeting of the New England Association of Gas Engineers will be held Wednesday and Thursday, February 14th and 15th, 1912, at Young's Hotel, Boston.

Papers are being prepared on:

High Pressure Distribution. Gas Office Buildings. Industrial Appliances. Producer Practice in Water Gas Making. Shavings Scrubbers. Measurement of Flow in Mains. And on other subjects of interest.

Members will dine together Wednesday evening.

Those who wish to join the Association should send in application to the Secretary before the meeting. N. W. Gifford, Secretary.

BRIEFLY TOLD.

January Meeting, New York Section, I. E. S.—The New York Section, Illuminating Engineering Society, held its January meeting, the evening of the 11th inst. The subject of "Street Lighting" was the topic. The paper of the evening, describing modern conditions, was delivered in lecture form by Mr. H. Thurston Owens, and it was well illustrated by lantern slides. He was followed by Mr. Geo. S. Barrows, of Philadelphia, who described three types of high pressure gas lamps. The use of incandescent electric lamps was then covered by Mr. Johnston, of Cleveland, and two new types of electric arc lamps were described by Mr. S. L. E. Rose, of Schenectady, N. Y. Those entering the discussion were: Messrs. Louis Bell, Boston; J. R. Cravath, Chicago; Philander Betz, Newark, N. J.; H. W. Hillman, New Haven, Conn.; S. K. Campbell, Hempstead, N. Y.; W. T. Dempsey, N. Y. The attendance numbered 150, and among the gas men present were Messrs. Pettes, Young, French, Berg and Doyle.

The Southern Gas Association Meets in April.—So writes the Association's clever Secretary, Mr. E. D. Brewer, and thereto he further notes that the Association was organized at Atlanta, Ga., May, 1908, and held its first meeting at New Orleans, February, 1909. Thirty-seven active members were present and the papers presented were voted interesting, instructive and creditable. The second annual meeting was at Chattanooga, Tenn., February, 1910. Forty-eight active members were registered at Convention Hall, and the line of information in the papres read helped mightily toward solving some of the immediate problems confronting the gas men of the South. In April, 1911, the third annual meeting took place in the assembly room of the Exchange Hotel, at Montgomery, Ala. The papers read in the old capitol of the Confederacy were mostly along new business lines, but of such high grade order that when the proceedings were published the whole gas world sat up and took notice Gas men of national prominence were on the programme at Montgomery, and besides the lively discussion of papers there were other happenings that made an indelible impression upon the minds of merry but misunderstood gas men. (If you'll let him, Col. George Williams will tell you about a few.) 'Twas at Montgomery that the "Noblest Roman of them all," James Ferrier, was elevated to the Vice-Presidency, after serving the Association most faithfully since its beginning as Secretary and Treasurer. Sixty active members took part in the third annual meeting. Such, in brief, is the history of the Southern Gas Association, a movement begun less than 5 years ago, that has grown greater every succeeding year, and by the time of the Jacksonville meeting, in April, there is every reason to believe over 300 gas men will be on the Association's roll call. All departments of the gas business are represented in the Southern Gas Association, and the Chairman of the Paper Committee, Fourth Annual Meeting, Jacksonville, April 17, 18 and 19, has an unusually good line of topics in hand. The list of papers will be given out about two weeks from now. Mr. Harry B. Hoyt, the able President of the Association, and General Manager of the Jacksonville (Fla.) Gas Company, is working overtime to make the gas men have a profitable meeting in his town and to fix it so the gas people will enjoy themselves thoroughly.

Motor Trucks for Gas Company Use.—A notable paper that was read at the last meeting of the American Gas Institute, was by Mr. L. R. Dutton, whose treatment of the subject, "Commercial Motor Delivery: Cost and Results," was very complete. The paper, with the discussion that it evoked, plainly shows that the matter under consideration has not only received much thought from gas men and their companies, but that it is still a live subject, and as such will continue for quite a while. Last week and a part of this, New York city had in hand 3 distinct types of automobile shows, but the power vehicle show was potent to the point of inducing large numbers of people to visit headquarters. In connection with the "Truck Section, National Automobile Shows," Manager, H. W. Perry, of the "Publicity Section," thereof is responsible for the following sensible matter in the instance of the choosing of a motor truck, etc. Mr. Perry said:

How to go about the choosing of a motor truck or delivery wagon without making a costly mistake is a problem that to-day undoubtedly confronts thousands of business concerns. They have practically decided to adopt motor vehicles to facilitate their business, being convinced, by observation and keen foresight, that the mechanical road vehicle is just as inevitable to continued industrial and com-

mercial progress as were the steamship and the locomotive in their respective fields of transportation. But, while amply qualified by long experience to buy horses and wagons precisely suited to the conditions of their business, the motor wagon is such an unknown quantity to the great majority of business men that many are more or less at sea regarding the steps to be taken and the points to consider in making a decision. With well over 100 different makes in the market to choose from, and every possible size and type, from a tricycle parcel carrier, of 500 pounds capacity or less, to the ponderous 10-ton truck, there is no lack of opportunity to go astray if one depends solely upon his own judgment. What the prospective buyer really is in need of is more knowledge on the subject. The best buyer of goods or materials in any line is the one who has the widest and most intimate knowledge of those goods and materials. The obvious thing, then, is to get in touch with those who do know about the machines, and to make as careful a study as possible of the different kinds and sizes and their respective merits and capabilities. It is essential to the satisfactory use of a motor truck or delivery wagon that it be suited in all respects to the precise nature and volume of the work to be done, roads or streets to be traversed, topography of the vicinity where used, daily mileage required, and amount of care likely to be bestowed upon it on the road and in the garage. While there might be nothing seriously wrong in the design, material or workmanship of any one of 50 or a 100 different makes of machines, a bad selection with regard to the requirements of any particular case would probably cause trouble and disappointment. There are various sources of information to draw upon. As in every other line of business, there are a number of reliable trade journals devoted exclusively to this subject, that give the sort of information desired and reflect the status of the industry and standing of the various manufacturers. Your own trade organ will put you in touch with the leading truck and wagon manufacturers throughout the country, from whom catalogues and detailed records of service and cost of operation in different trades can be obtained for the asking. Sometimes valuable information can be obtained from other companies in the same line of business as your own, or which are doing work of a similar nature with motors. Sooner or later, however, it is pretty certain to develop that one should lay his case before the man who has made a special study, not only of the motor truck, but also of haulage and delivery service in many kinds of businesses. He is called the transportation expert. He knows the capabilities and limitations of gasoline and electric machines of all sizes, and can advise intelligently about the number, type, load capacity, speed, tire equipment and other factors best suited to the requirements of any particular case. Nearly all of the large truck companies have such men attached to their engineering and sales' departments, and are glad to furnish their recommendations free, provided the inquirer is within easy reach and has a sufficient business to lead to the expectation that he might become an important customer. By far the greatest educational factor is the big National Motor Car Shows, at which all the principal makes of trucks and delivery wagons can be examined and compared as to design, workmanship and price. There the experts, not of one or two, but of a dozen or more companies, may be consulted without establishing an implied obligation to buy from any company that confers the favor of such advice. It will be possible in one or two days time to gather information at the shows that would require months of effort to acquire in any other way. Nearly 70 different makes of business vehicles will be on exhibition in New York from January 10 to 17, and an equal number in Chicago from February 5 to 10. In all, fully 90 different companies will display their newest models this winter, among which will be many never before in the market.

CURRENT MENTION—

"D. R.," writing from Gloucester, Mass, under date of the 10th inst., says: "Owing to his usual mode of desiring to maintain self-respect, Mr. John A. Coffin, who was Superintendent and Manager of the Gloucester (Mass.) Gas Light Company, from 1883 to March, 1911, and who was then appointed Consulting Engineer of the Company by its new owners, tendered his resignation the 4th inst., and it was accepted."

Mr. William P. Nye, Secretary and Treasurer of the Providence (R. I.) Gas Company, died at his home, 20 Barnes street, Providence, the morning of Monday, the 1st inst. Mr. Nye had been in the service of the Company since 1872. He is survived by his widow and two sons, Walter A. and Wm. H.

"V. A. M.," writing under date of the 11th inst., says: "I failed to note any mention in the Journal of the death of Mr. Edward S. Brewer, a Director in the affairs of the Springfield (Mass.) Gas Light Company, of which his father (the late Edward S. Brewer) was one of the founders. Mr. Brewer passed away after a short illness, in the Hotel Woodstock, New York, the afternoon of the 18th ult. Mr. and Mrs. Brewer had been spending a few days in New York prior to the Christmas holidays. He contracted double-pneumonia, which speedily ran its fatal course. He was born in Thompsonville, Mass., January 22, 1848, and graduated from St. Paul's School, Concord, N. H., subsequently spending a year in travel through Europe. He engaged in business with his father's widely known hardware enterprise, bearing the title, J. D. Brewer & Sons. Delicate health caused him at the end of 3 years (1884) to visit the far-West, and he roughed it for quite awhile on a place near Denver, Col. About 1890 he returned East, and occupied the farm owned by his mother in West Hartford, Conn., but returned to Springfield, first occupying the 'George Howard place' on Crescent Hill, and later on purchased the Walcott place in Longmeadow, which was his last permanent abiding place, and which is known to-day as one of the most beautiful quarters in New England. He was a charter member of the Nayasset Club, and erected the building known as the Brewer Block, in which to house the Club properly. He was a member of the Winthrop Club, also of the Springfield Country Club, and had been Vice-President of the Hampden County Horticultural Society. He was prominent in Masonic circles, and was vestryman of Christ Church. His immediate survivors are his widow, and a son (Edward Harris Brewer, of Chicago), two daughters and a sister.

Mr. William H. Snow, General Manager of the Holyoke (Mass.) Municipal gas and electric plants, reports that during the past year, no changes were made of moment in the manufacturing apparatus, the increases of equipment having been made in connection with the distributing systems. Practically 3 miles of gas mains were laid, 230 new services had been run, and 894 new gas meters placed. The increase in gas output (6,114,200 cubic feet) figured at 3.10 per cent. The department had given 96,250 gallons of tar to the Board of Public Works, for use upon the public roads, which meant a saving to the city of not less than $6,000, had it been obliged to purchase that quantity in the open market. There had been added to the pole lines on current carrying account 26 miles of wires, and 194 poles had been put in line. Transformers to the number of 19, and meters to the number of 727 were put in service. The increase in electric current output was 9 per cent. The reduction in the price of street lights, and for the current used in the public buildings went into effect the beginning of 1911, which caused the reduction of $10,792 in the sum the city paid the Lighting Department, thus divided: On street lighting account, $8,472; in lighting of public buildings, $1,544; for power used, $775. During the year the new 8-hour labor law became effective, and the working thereof entailed an additional expense in respect of labor charges amounting to $6,762.

"B. M. L.," writing under date of the 8th inst., says that the Milwaukee Electric Railway and Light Company's mutual benefit association became effective and operative the 8th inst., and it is being generally availed of. The scheme was virtually worked out by Mr. C. Nesbit Duffy, the Comptroller of the Company, and he likely would be pleased to furnish details of the plan to any desirous of obtaining the same. The headquarters are in Milwaukee.

Mr. Ralph Healan, for many years prominently connected with the Peoples Gas Light and Coke Company, of Chicago, died the last week in December, in Baltimore, Md. He was in his 46th year.

At the annual meeting of the Haverhill (Mass.) Gas Employees' Association the officers elected were: President, Thomas Nickerson; Vice-President, H. von Vittinghoff; Recording Secretary, M. R. Milne; Financial Secretary and Treasurer, B. E. Stevens; Sergeant-at-Arms, Wm. Bell; Librarian, J. J. Cronin; Representative, Board of Trustees, 3 years, M. Canon; Rules Committee, J. E. Sullivan, J. W. Christian and J. J. Fennessey. The Association prospers exceedingly.

Under the last quarterly distribution of profit-sharing stock to its employees, the New Haven (Conn.) Gas Light Company awarded 83 shares. On this account 11,036 shares have been distributed to 207 employees. The stock so held has a market value of $45,325.

The betterments on the plant of the Helena (Ark.) Gas and Electric Company are in a very forward state, and will easily be completed within the period agreed upon for their completion.

The Public Service Commission, State of New Hampshire, has made public this announcement: "The Public Service Commission has been advised by the Keene Gas and Electric Company, which operates in the city of Keene and towns in Cheshire county, of its desire to adopt a new schedule of rates and charges for gas and electric service in its territory, effective January 1, 1912. The schedule makes a reduction on gas from a base rate of $1.60 to a base rate of $1.50, and on electric lighting from a base rate of 15 cents to a base rate of 14 cents, leaving the power rates without change. To this schedule the Commission has given its approval and the new rates will be effective from the date mentioned.

Mr. Charles Taylor Catlin, at one time Secretary of the Citizens Gas Light Company, of Brooklyn, N. Y., now a factor in the Brooklyn Union Gas Company, died at his home in the Hotel St. George, Brooklyn, the morning of the 4th inst. He was in his 87th year, having been born in New Brighton, Staten Island, N. Y., May 25, 1835.

(*Continued from p. 39.*)

TABLE V.—*Small Currents Flowing in Mains Protected by Insulating Joints.*

City.	Mains Type.	Mains Class	Mains Size Ins.	Joints Age, Years.	Joints Kind	Distribution of Insulating Joints in Mains.	Section in which Drop was Measured: Distance to Joint.	Section in which Drop was Measured: Length Feet.	Average Potential Across Section Millivolts.	Amp. in Pipe.
Wilkinsburg	Cast	D	12	3	Leadite	12 ft.	Adj.	12	—0.013	0.065
Wilkinsburg	Cast	D	12	3	Leadite	12 ft.	Adj.	10½	0.013	0.072
Wilkinsburg	Cast	D	12	3	Leadite	12 ft.	Adj.	11	0.013	0.164
Wilkinsburg	Cast	D	12	2	Leadite	12 ft.	Adj.	8	0.01	0.073
Wilkinsburg	Cast	D	12	2	Leadite	12 ft.	Adj.	11	0.041	0.217
Wilkinsburg	Cast	D	12	3	Leadite	12 ft.	Adj.	11	0.01	0.053
Wilkinsburg	Cast	D	12	4	Leadite	Insolat.	Adj.	10½	0.02	0 112
Wilkinsburg	Cast	D	12	4	Leadite	300 ft.	Adj.	11	0.2	0.106
Wilkinsburg	Cast	D	12	3	Wood	Insolat.	Adj.	6	0.1	0.10
Wilkinsburg	Cast	D	12	3	Wood	Insolat.	100	6	0.3	0.30
Erie	Wrot.	Stan.	4	4	No. 6 D	20 ft.	Adj.	8	<0.0025	<0.0125
Erie	Wrot.	Stan.	6	4	No. 6 D	Insolat.	Adj.	3	0.005	0.167
Erie	Wrot.	Stan.	4	4	No. 6 D	Irreg.	Adj.	225	0.01	0 26
Erie	Wrot.	Stan.	6	4	No. 6 D	Irreg.	Adj.	3	0.0025	0.086
Erie	Wrot.	Stan.	4	4	No. 6 D	Irreg.	Adj.	2½	0.01	0.236
Erie	Wrot.	Stan.	6	4	No. 6 D	Irreg.	Adj.	1½	<0.0025	<0.196
Erie	Wrot.	Stan.	8	4	No. 6 D	Irreg.	Adj.	2½	<0.0025	<0.156
Erie	Wrot.	Stan.	3	4	No. 39 D	20 ft.	Adj.	2½	0.005	0.108
Ashtabula	Wrot.	Stan.	3	2	No. 6 D	Irreg.	1,000	10	<0.0025	<0.0125
Ashtabula	Wrot.	Stan.	3	2	No. 6 D	Irreg.	1,300	4	—0.01	—0.104
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	200	10	0.015	0.088
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	Adj.	3	0.025	0.075
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	1,200	6	0.02	0.197
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	600	6	0.01	0.098
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	Adj.	4	0.0025	0.037
Ashtabula	Cast	C	6	2	No. 6 D	Irreg.	Adj.	3½	0.01	0.0595
Ashtabula	Wrot.	Stan.	3	2	No. 6 D	Irreg.	500	10	0.015	0.062
Ashtabula	Cast	C	8	2	No. 6 D	Irreg.	2,500	6	0.2	0.09
Ashtabula	Wrot.	Stan.	4	2	No. 6 D	Irreg.	750	6	0.1	0.098
Ashtabula	Cast	C	6	10	Cement	12 ft.	Adj.	11	0.0015	0.005
Ashtabula	Cast	C	6	10	Cement	12 ft.	Adj.	11	0.015	0.028
Ashtabula	Cast	C	6	10	Cement	12 ft.	Adj.	11	0.05	0.095

TABLE VI.—*Current in Mains when Joints are Infrequent.*

City.	Mains Type.	Mains Class.	Mains Size Ins.	Joints Type.	Joints Age, Years.	Distribution of Insulation in Mains.	Section in which Drop was Measured: Dis. from Insul. Joints.	Section in which Drop was Measured: Length, Feet.	Average Potential Across Section. Millivolts.	Amp. in Pipe.
Wilkinsburg	Cast	D	8	Leadite	4	Insolat.	Adj.	9	0.2	0.6
Wilkinsburg	Cast	C	30	Leadite	3	Insolat.	Adj.	11	0.2	4.08
Erie	Wrot.	Stan.	6	No. 6 D.	4	Irreg.	1,000	3	0.04	1.39
Erie	Wrot.	Stan.	6	No. 6 D.	4	Irreg.	600	2½	0.25	8.5
Erie	Wrot.	Stan.	4	No. 6 D.	4	Irreg.	300	2	0.11	3.24
Ashtabula	Wrot.	Stan.	4	No. 6 D.	2	Irreg.	200	19	1.0	3.1
Ashtabula	Wrot.	Casing.	5⅝	No. 6 D.	2	Irreg.	2,500	6	0.05	0.78
Ashtabula	Wrot.	Stan.	6	No. 6 D.	2	Irreg.	1,200	2	0.4	2.08
Ashtabula	Wrot.	Stan.	8	No. 6 D.	2	Irreg.	300	3	0.6	3.12
Ashtabula	Wrot.	Stan.	4	No. 6 D.	2	Irreg.	1,200	2½	0.4	0.25

TABLE VIII.—*Resistance Joints.*

City.	Mains Kind.	Mains Class.	Mains Size, Ins.	Joints Type.	Joints Age, Years.	Average Potential Across Joint Millivolts.	Resistance of Joint: Ohms.	Resistance of Joint: Length of Pipe with same Resistance, Ft.
Wilkinsburg	Cast	D	8	Leadite	4	0.8	0.00133	36
Wilkinsburg	Cast	D	8	Leadite	4	20.0	0.033	900
Wilkinsburg	Cast	D	12	Leadite	3	8.0	0.123	7,100
Wilkinsburg	Cast	D	12	Leadite	3	0.02	0.0003	75
Wilkinsburg	Cast	D	12	Leadite	3	0.3	0.004	241
Wilkinsburg	Cast	D	12	Leadite	3	1.0	0.014	810
Wilkinsburg	Cast	D	12	Leadite	3	5.0	0.08	1,770
Wilkinsburg	Cast	D	12	Leadite	3	5.0	0.03	1,770
Wilkinsburg	Cass	D	12	Leadite	2	0.15	0.002	120
Wilkinsburg	Cast	D	12	Leadite	2	4.0	0.018	1,100
Wilkinsburg	Cast	D	12	Leadite	2	11.0	0.051	3,000
Wilkinsburg	Cast	C	30	Leadite	3	60.0	0.015	3,300
Wilkinsburg	Cast	C	30	Leadite	3	5.0	0.0012	275
Wilkinsburg	Cast	D	12	Leadite	3	3.0	0.0052	315
Wilkinsburg	Cast	D	12	Leadite	3	3.0	0.0052	315
Wilkinsburg	Cast	D	12	Leadite	3	0.6	0.0113	660
Wilkinsburg	Cast	D	12	Leadite	3	0.12	0.226	13,200
Wilkinsburg	Cast	D	12	Leadite	4	40.0	0.357	20,600
Wilkinsburg	Cast	D	12	Leadite	4	30.0	0.268	15,450
Wilkinsburg	Cast	D	12	Leadite	4	40.0	0.357	20,600
Wilkinsburg	Cast	D	12	Leadite	4	3.0	0.028	1,650
Wilkinsburg	Cast	D	12	Leadite	4	6.0	0.057	3,300
Wilkinsburg	Cast	D	12	18′ wood stave	3	4000.0	40.0	2,400,000
Erie	Wrot.	Stan.	4	No. 6 D	4	57.0	<2.64	<183,000
Erie	Wrot.	Stan.	6	No. 6 D	4	60.0	0.36	36,000
Erie	Wrot.	Stan.	4	No. 6 D	4	1300.0	4.96	292,000
Erie	Wrot.	Stan.	6	No. 6 D	4	400.0	4.65	480,000
Erie	Wrot.	Stan.	4	No. 6 D	4	100.0	0.425	25,000
Erie	Wrot.	Stan.	6	No. 6 D	4	800.0	<5.35	<560,000
Erie	Wrot.	Stan.	8	No. 6 D	4	750.0	<9.0	<1,400,000
Ashtabula	Wrot.	Stan.	4	No. 6 D	2	400.0	10.65	1,600,000
Ashtabula	Wrot.	Stan.	4	No. 6 D	2	200.0	9.5	560,000
Ashtabula	Cast	C	6	No. 6 D	2	80.0	0.286	59,500
Ashtabula	Cast	C	6	Cement	10	0.01	0.002	44
Ashtabula	Cast	C	6	Cement	10	0.02	0.004	88
Ashtabula	Cast	C	6	Cement	10	6.0	0.21	4,400
Ashtabula	Cast	C	6	Cement	10	0.06	0.0021	46
Ashtabula	Cast	C	6	Cement	10	13.0	0.14	2,900
Ashtabula	Cast	C	6	Cement	10	80.0	16.0	350,000
Ashtabula	Cast	C	6	Cement	10	20.0	0.21	4,400

in connection with such installations which, if not guarded against, may give rise to considerable trouble. In the first place, joints designed and installed as insulating joints may, or may not, be insulating when completed, and this is especially apt to be true after the joints have been in service for a considerable length of time. A little carelessness in making the joint may permit the two ends of the pipe to make metallic contact, in which case, of course, the joint becomes worthless as a protection against electrolysis. This is particularly apt to occur in making joints where cement or leadite is substituted for lead. Table VIII. shows the resistances of a number of so-called insulating joints in actual service selected at random, which are typical of what may be expected. In measuring these resistances a joint and a portion of the pipe were uncovered and the drop across the joint compared with that across a measured length of pipe, either by means of a voltmeter or with a slide-wire bridge. The size, weight and material of the pipe being known, the resistance of both pipe and joint in ohms could also be calculated with a fair degree of accuracy. It is to be noted that a number of joints show an extremely low resistance, comparable with that of an ordinary lead joint, thereby indicating metallic contact of the pipes. This is particularly true of some of the leadite joints. It is important to note that the leadite joints were made without any attempt to make them insulating, and this is largely responsible for the large proportion of very low resistance joints. Perhaps the most surprising feature of this table is the low resistance shown by the Dresser couplings, which had been in service for a number of years. Although these joints are provided with rubber gaskets, and doubtless have a very high resistance when new, the resistances have now fallen to but a few ohms. A joint having a resistance of this magnitude however, is practically as good as one of much higher resistance, since only currents of negligible value can flow through such a resistance under the differences of potential that would commonly prevail across the joint in practice. In the case of the joints having a resistance of a few hundredths of an ohm, or lower, currents of considerable magnitude may be found, and these cannot be regarded as satisfactory resistance joints, except in pipes of very large size. With reasonable care in the making, however, all joints, whether made of cement or wood, or some special joint, like the Dresser or Hammon couplings, will have ample resistance, and if properly located and used in a proper manner any of these joints should prove effective.

(To be Continued.)

[Continued from Page 29.]

PROCEEDINGS, SEVENTH ANNUAL CONVENTION, NATIONAL COMMERCIAL GAS ASSOCIATION.

Held in Denver, Col., October 24 to 28, 1911.

Third Day—Afternoon Session.

President Stannard then called for the paper by Mr. Charles E. Ummach, of Chicago, Ills., on

THE MODERN GAS FIXTURE,

which was read as follows:

This subject is one that should be of vast importance to gas companies. I feel indeed honored in being requested to prepare a paper on so vital a subject, to be read before a critical and intelligent audience, and I fear that my shortcomings in compiling a paper that will cover the salient points will be very much in evidence. However, as I promised to do my duty, I will relate my experience in the most concise form.

Gas fixture is a compound word that has been in use close to a century; it signifies a great deal, but actually has no real meaning, in so far as conveying to the mind what the article really is, so in the past few years a large number of fixture manufacturers dropped the title gas fixture and now use the title, lighting fixtures. The reason for this change is directly the outgrowth to loss of interest by the manufacturers of gas fixtures, owing to the fact that electric companies, in order to promote the sale of their product, introduced a classy, up-to-date, decorative effect in lighting fixtures, and the gas companies at no particular time have devoted much energy to promote the sale of their product by the use of gas lighting appliances; therefore, as they were unfamiliar with what actually existed in the way of lighting effects, and allowed themselves to be forced to a condition of severe competition through the efforts of the electric companies, inroads were readily made by the electric people: First, by convincing a gas consumer of better service; secondly, by the decorative effect that could be had if electric were used as an illuminant, the cost proving not to be a serious consideration. The gas company being confronted with such conditions determined to hold what it had, get back what it lost, and solicited in new fields for the purpose of selling more gas, The idea, no doubt, was a good one and quite necessary; but the methods adopted were not of the best, as the slogan was quantity and *not quality*, the result appearing in the form of cheap gas fixtures, as the manufacturers were not encouraged to make a better grade of fixtures, the sale of which became practically a dead issue, and they immediately put their force of designers and mechanics to work on electric fixtures, for the electric companies kept right after the consumer with an educational plan of better goods, better light and better service. We all know that the general design of an electric fixture is the outgrowth of the old time gas fixture. At one time some very beautifully designed gas fixtures were manufactured and are still in use, but the practical lighting effects could not be had owing to the common, open flame, gas burners. These conditions, however, are very much changed, and the invention and adoption of the upright incandescent gas burner was the forerunner, and, in fact, the kite to which the gas companies had to tie to save their lighting business. Gas arcs were liberally installed, then the inverted type of mantle burner was introduced and proved practical in every way; it made it possible to harness the light and couple it with decorative effects. Some of the manufacturers again were encouraged on account of these changes, and are now designing and making fixtures for gas only of a higher grade. It is quite apparent, however, that this movement has as yet not had the proper support of the gas companies.

Modern gas fixtures should be constructed so as to give the best results from a practical lighting standpoint, without destroying the decorative effects. Careful study of construction is very necessary. The proper placing of shut-off keys is extremely vital, so as to overcome as much as possible the conduction of heat and so avoid the contraction and expansion of metal, as well as drying out the key grease used as a lubricant. As yet no one has been able to actually overcome the objectionable features of damaged finish, caused mostly by the use of an inverted incandescent gas burner. The action of intense heat on the lacquer, coupled with carbon deposits caused by improperly adjusted burners, at other times on account of the variance of gas pressure, has a tendency to turn the metal parts that come directly in contact with such action into a gray-black or burned brass finish, making the contrast with the balance of the fixture rather unsightly. This, however, can be overcome to a certain degree by having the finish of fixture in "old brass" or "antique brass."

The design of a modern gas fixture is a matter of decoration; the old type of chandeliers were patterned after the various periods of design and the method is still in vogue. Changes in construction in both gas and electric fixtures have been most notable of late years, and nearly all have proven practicable. A vast number of lighting effects have been made possible by the use of electricity as an illuminant, and similar effects are now procured by the use of the inverted gas burner, as well as a similar type of upright incandescent gas burner arranged with glassware and holders of such sizes as to permit the use of the regulation size electric shades. It may seem strange that it is necessary to imitate electric lighting effects, but it falls to our lot to keep apace with the times. The electric fixture is nothing more than a direct imitation of the gas fixture, and from time-to-time improvements were made that not only added beauty to the design, but resulted in a more practical method of illumination.

As time goes on we learn of our shortcomings and actual conditions that must be met, which again will result in changes of construction, as well as in design. Modern gas fixtures will undergo more changes than modern electric fixtures, owing to the construction of a gas fixture, as it is more exacting, and the possibilities of the appearance of the old bogey (leak) must be reduced to a minimum and cut less than 4 letters if possible.

We are confronted with a new problem—the indirect method of lighting; a very good way indeed, it requiring a greater amount of energy to gain the proper results. A great many indirect lighting installations are in use and no doubt satisfactory; in fact, in some instances, this is the ideal way of lighting a room. Very few indirect gas installations have thus far been made, but the possibilities are just as great and encouraging for gas as for electricity, particularly with the use of an upright incandescent gas burner.

There is an open field and an ever-broadening outlook for gas lighting, and, aside from possibly a few overcrowded centers, gas will always be one of the chief sources of illumination. Wealth is increas-

ing, culture is becoming broader, and the knowledge of and desire for the best in the home is growing more acute. An energy equal in quantity and quality to that squandered on the propaganda (of gas for fuel) will go far to wrest the banner of lighting supremacy from the electric fixture and actual co-operation between gas companies and fixture manufacturers is positively needed. *Mere cheapness must be forgotten.* Tell your consumer something of *good light*, its possibilities both as a decorative element and as a dollar-for-dollar investment, its greater efficiency and the result will do much to encourage the gas company as well as the fixture manufacturer.

Discussion.

The President said, in inviting discussion on the paper, that no doubt they all had greatly enjoyed it, for its many excellent points.

The Secretary announced that a contribution to the discussion, prepared by Mr. W. W. Barnes on the Ummach paper, had been handed him to read, Mr. Barnes not being able to be present. The contribution was as follows:

Mr. Ummach's vast experience and ability as a manufacturer of gas fixtures are evidenced by the very good paper just read. What we want to know, forgetting for the moment what our electric friends are creating, is, "What is the modern gas fixture?" Is it the fixture that 90 per cent. of the gas companies are selling to day as the means of increasing their output, or is it the fixture wherein quality of workmanship is considered and where the right kind of light is secured in the right place? The modern fixture, to my mind, is not one of the single design, but several that are adaptable to their various locations. The primary law of illumination is that glare must be avoided at any cost, for glare strains and blinds the eye. Light should be steady, soft and evenly distributed, and in large rooms there should be several sources of light. Unfortunately, many manufacturers of gas fixtures have only one idea in mind in the construction of their product, that being how cheap can a fixture be made that is gas tight and secure "Mr. Goodbuyer's business?" That is a broad statement, but one of fact. The idea of giving good illumination never entered the mind of the manufacturer, nor has it been given any thought by the prospective buyer. This statement applies to the majority of cases. A few gas companies, and their number, I am happy to state, is rapidly growing, are educating consumers of gas to the use of a better grade of fixture; one built on lines to give satisfactory results by the aid of the latest incandescent gas lamps now manufactured and broadly sold. Mr. Ummach is right in the statement that gas companies have not given the manufacturer the proper support in the purchase of high grade fixtures. The few corporations, who went to considerable expense in fitting up attractive showrooms, with gas fixtures of good design and superior workmanship, have found the investment a good one. It is a campaign of education, which campaign wins out, if closely followed up. To attain this end it is strictly up to the gas company, for the moment your consumer goes to the fixture dealer, for some reason or other, he influences the prospective buyer in the installation of electric fixtures. Why does the dealer do this? For the simple reason, as before stated, the gas man has not given the dealer the support or co-operation he should. If the dealer bids on gas fixtures the order would go to the gas company, for the reason that the dealer could not survive on the average profit the gas company asks on this product. The gas company can afford to sell at low prices, as a sale brings a consumer for all time to come. Thus, I say, the proposition is up to you. To intelligently present my ideas on this subject, let me divide the subject into three classes, namely: Commercial, factory and home. For commercial purposes what better results can be attained than through the installation of fixtures of neat design and workmanship, say a 2 or a 4-light fixture having ample spread, with an equal number of inverted burners, exercising care in the proper distribution of the units, avoiding shadows, thus casting a mellow and pleasing light on objects beneath. These fixtures are constructed both of metal and composition and give far greater satisfaction, from an illuminating standpoint, than anything heretofore offered, with apologies to the gas arc. Many of you who have made installations of this kind have been well paid from a satisfied consumer's standpoint. In showrooms, where articles of furniture are shown, upright lamps in composition bowls have been used with excellent results, by means of the indirect system of illumination, where the light goes to the ceiling, there to be reflected and diffused agreeably without shadows. This gives us two modern gas fixtures.

Factory Use.—For the workman's bench in factory use the inverted burner, with proper reflecting shades suspended or inverted brass or iron pendants, is the ideal installation, the gas arc being used for lighting wide areas, warehouses, foundries, etc. I could cite many installations of this character, where the smile of the happy workman or shopwoman has been gained by giving them ample light under which to work. In Gloversville, N. Y., nearly every glove factory has been equipped with installations of this kind, and the men and women operators were highly pleased the moment their employers were considerate enough of their welfare to give them a soft and mellow light by which to work. For the home, the modern fixture to-day is no longer a fixture supplying gas only, which is a harsh statement to make to gas men; but we must accept facts. It is a combination fixture, and when I so say, I do not mean a fixture whereby all the advantage is given to the use of electricity—I refer to a fixture wherein both gas and electricity are given an even chance. A fixture wherein the gas and electric arms are similar, both being turned to a 90° angle on which the inverted gas burner is used for gas, a dummy gasholder being used over the electric socket, permitting the same glassware to be uaed throughout. This is the installation to-day in a modern home and in verification of this statement, I ask you, Mr. "New Business Man," if I am not correct. Accepting fact, which you must surely, sooner or later, why not start now, and instead of selling gas fixtures only equip your showrooms with a line of combination fixtures as well and hold your consumers? Many companies appreciating this condition are now displaying modern fixtures in both gas and combination, and in the majority of cases the sale of combination fixtures far exceeds those of straight gas, for the reason that higher decorative effects can be attained and a higher grade of product sold. This subject is one that carries much careful thought for the gas man to-day. We cannot stand still. Progress, and being abreast of the times, demand action. The public must be considered and, as before stated, the modern home being equipped with combination fixtures, why not now put yourself in a position to supply this evergrowing demand, and not waste energy trying to convince a thoughtful public that gas is the only illuminant. Some of you may think, or say you are admitting defeat in meeting this condition. It is no defeat. In fact, to my mind, you might better sell a product of this kind than let the prospective buyer install almost entirely fixtures wherein gas is virtually eliminated, except for a few side brackets. As the years roll by, the trend of gas and electric interest seems to be towards the consolidation of both in one company. Many instances of this kind have occurred in the past few years, and how noticeable it is that the gas man is quickly converted to a broader way of thinking and acting on this subject. The oldtime enemy is to-day our friend. Gas and electricity both have their advocates. This is the thought of the architect and the builder who, in equipping the twentieth century home, aim to give the prospective home buyer up-to-date and modern fixtures wherewith the friends of one or the other illuminants are satisfied and happy.

Mr. Eves said the writer of the paper dealt with modern gas fixtures, not with gas lighting; but in the paper, he was very glad to see that occasion was taken to mention the new indirect method of lighting with gas. They had used that system in Indianapolis with considerable success, which success had been accomplished using the old style gas fixture. He thought, if a suggestion were made that that method of lighting demanded the attention of the fixture manufacturer, so that the latter might get out a fixture which would conform more to indirect lighting systems, the suggestion might possibly be acceptable and beneficial to all. The pioneer of this indirect lighting system (Mr. Carl H. Graf, of Indianapolis) was with them, and as this subject was practically a new one with them, he was sure they would be very glad to have Mr. Graf tell with what success they had utilized this method of indirect lighting in Indianapolis.

Mr. Graf said he could hardly claim pioneership in indirect lighting business, but he would say, when they rearranged their offices last spring, they were not absolutely sure as to what arrangement would be best in the main office. For that reason he thought an indirect lighting system would be feasible; but, of course, being a Gas Company, they could not use the electric current. The matter was taken up with some illuminating engineers, who rather discouraged the idea of obtaining a system of indirect lighting with vertical burners, which they claimed would give us the desired results; namely, that desks could be placed anywhere in the room and still be perfectly lighted. They accepted the plan, with one change, however; for instead of using the fixtures as sent in, they simply turned the burner cocks up instead of down and put on upright burners. They then called on their friends in the Welsbach Company and took what reflectors that happened to be in stock, and picked out an ordinary,

simple reflector, at an angle of about 60°, and put those on with the upright burners. The outcome of the first attempt was pleasing to the point that they were all very much surprised. To get at it intelligently, they decorated a room, just as they thought it should be decorated. They made the ceiling white—it was really a blue-white—and the side walls a yellowish white. While that gave a very good effect, they found the same was a trifle bettered by putting a cream-white on the ceiling instead of a blue. The room was about 15 feet square, and the arms on the fixture were at least 4 feet long, taking the burners from the 4 corners. Then they dropped back to an ordinary fixture, with perhaps a 12-inch arm, and found the effect equally good. The experiments were so pleasing to everybody in the Company that they tried it out on all the clerks, having them bring up their ledgers, putting them down in the corner, their backs being to the light, and in no case did they get in the shadow or notice a reflection on their paper. Their architect, whose offices are in the Company's building, became quite interested, so they invited him to inspect the system. The room in which they were trying it out was on the main hallway, but connected with a door from another room, the door being slightly ajar. The other room was filled with sunlight. Walking toward the other door, the architect was right at his heels. Asking him what he thought of the lighting, his reply was, "I thought it was sunlight," which caused the speaker to say that was all the recommendation they needed. Their entire main office, the salesmen's room and his own room were all fitted now for indirect lighting. Perhaps they had not had a really good opportunity to try it out, as the plan was installed at the beginning of the long days. Some of the lights had been in use every summer month, and so far the ceilings did not seem to show any effect from the lights. They obviated this by putting a canopy over the tops of the burners. In fact, the only trouble they really had so far was through the pilot light going out, each burner being equipped with a pilot. They will become extinguished when windows are raised and a draft is created in the room. He hoped gas men would take up the matter of indirect lighting, and that the illuminating engineers would devise reflectors properly designed to meet conditions. He did not believe indirect lighting could be applied to every proposition, but thought the field was almost unlimited.

A member thought it might be useful to briefly recount what they had been doing in Philadelphia toward improving the modern gas fixture. Two years ago their new business department, in connection with the manufacturers, tried to sell their customers a very much better type of gas fixture than had been generally handled in the city. They only covered a very narrow field and did not sell many fixtures in Philadelphia, the Gas Company there selling all the fixtures used by Philadelphia builders, who erected something like 7,000 houses every year. They were able, fortunately, to cover every order, because they succeeded to the rights of the city in covering the piping of houses, and while, for a number of years, they had to an extent been making certain regulations about gas fixtures, it was not until 1909 that they began to be much more particular. The builders, in getting bids, had been pitting the gas fixture dealers against each other, and the fixture business was almost to the finishing point. So they started in with new specifications for fixture cocks, and after 2 or 3 years thought over the subject, and in conversation with our fixture dealers they decided on what are called the 1912 specifications for fixture cocks, which fixture cocks will go into effect July 1, 1912. The result is that all fixture dealers and manufacturers are quite satisfied. There were some points on which they were not quite able to agree, but both were practically satisfied. So in Philadelphia, about July 1st, every house would have a much better type of cock, therefore a much better type of fixture than ever before. This brought up a further point. The cock had some likeness to the Boston cock. The fixture manufacturer had advised two styles, but they could not take the Boston type, in that it did not go far enough. We think, among the many things the Association had before it, an important thing would be the attempt to standardize gas fixture requirements; he did not mean, of course, artistic requirements. Standard cocks being accepted by Philadelphia, Chicago and New York—in fact, all over the United States—would tend, of course, to economy and efficiency. Another point he liked to emphasize is that gas companies should co-operate with the manufacturers, just as had been done in the American Gas Institute, which secured standards for pipe and special castings by advising with the manufacturers. The sane way to handle this fixture proposition was to take the manufacturer into their confidence and try to get the best they could from them before deciding on any special fixture or cock. [Applause.]

Mr. E. L. Elliott thought the Ummach presentation contained almost everything connected with the subject of lighting fixtures, and if they expanded all the different points made by him they would have a pretty complete digest of the subject. In one paragraph it is written, "Electric companies kept right after the consumer with an educational campaign for better goods, better light and better service." There is a text that he thought they would do well to paste on the faces of their watches. That was exactly what the electric companies had been doing, and it was what the gas companies must do if they expected to hold their own or make any inroads upon the success that the electric companies had in displacing gas an an illuminant. Again: "At one time some very beautifully designed gas fixtures were manufactured and are still in use, but the practical lighting effects could not be had, owing to the common, open flame, gas burners." It was only within recent times that a few manufacturers, as far as he had been able to discover, put out any combination or gas fixtures fitted to go out with mantle burners; but in the combination fixture of to-day, as put up in the showroom, one had a fixture with probably a so-called imitation candle for the gas flame, the rest being electric, to which was attached an ornamental shade. They still had the primitive gas light in combination on that same fixture, with a modern electric lamp. It has been roughly estimated, he believed, that 85 per cent. of the gas used for illumination in this country was still used in open flame. Perhaps that was a little high at the present time, but he judged, as near as one could from the figures quoted, that 75 per cent. of the gas used for illumination was still used in open flames. As they all knew artistic possibilities with the open flames were very limited. The next improvement suggested concerned the gas arc. The latter had a very wide future, and rightly so, on account of its efficiency, simplicity and availability, but in that the manufacturers had not realized their opportunities in making an ornamental unit; nor was the original arc electric lamp an artistic thing; indeed its case was very hard to treat artistically, and there was probably no single feature of electric lighting to-day that was doing more to displace the old carbon arc than the fact that arc lamps were not decorative. The gas arc, as its name indicated, was assimilation of the electric arc, and the same lack of decorative feature was manifested in it. A highly polished nickle case was not especially refined, nor was a white enamel one. Nickle plate was very good in its place—say for a spigot to a water tap, and white enamel was splendid for cooking utensils, but really, neither one of them is highly decorative—they would not put either one of them into their parlors; but that was not the fault of the construction of the gas arc by any manner of means, for it was a large unit susceptible to all kinds of highly decorative treatment. Even where used outside some attention should be given to its artistic appearance, for they had passed the time when any old kind of a lamp could be hung out for street illumination. Really, the time was at hand to talk about decorative street lighting, the decoration being not only in the light but in the fixture as well. Mr. Ummach again says: "A vast number of lighting effects have been made possible by the use of electricity as an illuminant, and similar effects are now procured by the use of the inverted gas burner." There seemed to prevail a general opinion that decorative features in lighting were made possible only by the inverted burner, and were not possible with the upright. That was a most serious mistake. The inverted burner, as Mr. Ummach stated later on in his paper, had the great disadvantage of discoloring the metal work above it, a thing that one could not get around, and which the upright burner did not have. Recalling some of the most decorative electric fixtures one could think of, it would be noted the electric lamp was put in an upright position? They would likely find, in more than a majority of cases, the fixture designer, architect or manufacturer had placed his electric lamp upright, even on the streets, for decorative effect, yet it is said we had to wait for an inverted burner to enable us to make a decorative gas fixture. Examine catalogues of foreign fixture makers, in places where gas is still the leading illuminant, and they would find they had produced exactly the same effects with upright mantle burners as had been done with electric lamps. The small unit, mantle burner had added to the possibilities of decoration in that regard, so that in the planning of decorative features, especially of combination type, the upright burner was by no means a back number. The paragraph that seemed interpolative, had to do wtih the introduction of illuminating engineering, which Mr. Ummach attributed to Mr. V. R. Lansingh. He would not like to decry the excellent work Mr. Lansingh had done, but he did want to take this occasion to mention the man who was more largely responsible for illuminating engineering, its expansion and its introduction as a science, than any other man, a man whose name I presume not one of you have ever heard, such was the retiring character of this man, Mr. O. A. Mygatt. He had backed illuminating engineering with faith and personal fortune for 8 years continuously before the art began to make any impression upon the public. Mr. Lansingh's conversion to illuminating engineering happened in 1901, some 3 or 4 years after the real beginning of the science. It took place in August, as he recollected it, and it required about 2 hours of the speaker's best oratorical efforts to convert him. As to indirect lighting, he was glad to note the great attention aroused over this method of illumination for gas. He believed it would become one of the commonest and most important methods of illumination. He stated that as a result of observations made of the system in various places, and on the opinions that have been expressed by those who worked under it. He trusted they all realized that they had dined that day under indirect illumination, and thus had an opportunity to test it for themselves. In the case of a very large publishing house, building the largest plant in the world, they made a practical trial of different systems of lighting. They had a room in which some 200 women were employed at clerical work. They installed in that room every available form of illumination, letting the operators work under it for 2 weeks. At the end of the test a vote was taken as to which was the best method, and the vote was unanimous in favor of indirect lighting. [Applause.] Some months ago a certain electrical illuminating engineer, of Chicago, wrote an article for an electrical paper, dilating with some glee upon the fact that indirect lighting was not available for gas, because they could not get an efficient reflector that would stand the heat; also, that it soiled the ceiling. But these were only minor points. It was quite simple to make a reflector that would stand the heat around a gas flame, for all knew of reflectors that would stand the heat from automobile lamps. In fact all one had to do was to go after it and see that it was done; and it might interest them to know that manufacturers are now working on this problem. The point of blackening the ceiling by upward air drafts carrying dust and causing the same to adhere, as it would around a radiator or any other apparatus that

causes upward drafts could be obviated, in the manner shown in the lighting of the office building of the Peoples Gas Light and Coke Company, Chicago, which was done by placing a plate of white enamel above the fixture, possibly white glass, which could be easily and quickly cleaned, and which was a very efficient reflector when clean. Last June, in New York was held an exhibit of blind workers, and in such connection there was an exhibit given by the newly formed American Association for the Conservation of Vision, in which was shown a model school room, intending to demonstrate all the facilities that were best calculated to protect the eyes of the pupils. There were two methods of lighting; one direct, with electricity; the other was an improved indirect gas lighting method. Being in very close touch with that exhibit, he had an opportunity of seeing how that method of indirect lighting took the public; and it was simply the hit of the show. It created more attention than any other thing, unless it were the blind girls doing cooking with gas, which was rather interesting. So he wished to recommend most emphatically that people interested in promoting gas illumination, should study the subject of indirect lighting by gas, and that its advocates also co-operate with the fixture manufacturer, giving him your support, and seeing to it that the fixture that goes out, be it either a combination or gas, goes out as a modern fixture. Someone had asked, "What is a modern fixture?" It was a fixture carrying a modern gas burner, and fitted with all the modern accessories instead of these miserable, old, imitation gas mantles, that were relics of the candle of by-gone ages. They should aim to advertise that fixture fitted with a modern mantle lamp, and a modern lighting arrangement, either by-pass or electric heated wiring, and modern appliances, in which way he believed they would find themselves in possession of the large part of a very profitable field for a long time. [Applause.]

Mr. Hanlan said the whole matter of artistic gas fixtures had perplexed many of them, and not in little degree. The question had been debated whether gas companies should sell fixtures. He believed all gas companies should sell good, substantial, artistic fixtures, ones designed to meet the requirements of places where they were used. Such Companies as the Boston Consolidated, the Peoples Gas Light and Coke, of Chicago, and the U. G. I., of Philadelphia, had, judging from their display of fixtures, domes and portables, given the question of artistic fixtures the consideration that the matter deserved, and no doubt many other Companies have done likewise. In 1910 the New Jersey Public Service Gas Company sold 32,689 fixtures, which was a substantial increase over 1909, showing that much gas fixture business may be had if gone after. During 1911 their Company had practically changed its entire line of fixtures, substituting more artistic ones, many of which were of the inverted type. The fixtures are of very substantial construction, and embodying, as they do, improvements in design, necessarily sell for more money, but purchasers were willing to pay the increased price. At the beginning of this discussion he had said the whole matter of gas fixtures was perplexing, in saying which he had particularly in mind the solving of the problem of having fixture dealers furnish an artistic gas fixture and an artistic combination fixture, where such was specified in new buildings, knowing that they, to a large extent, did not give the attention they felt should be given to the making of these types of fixtures. They were co-operating with the manufacturers furnishing them with fixtures and were endeavoring to have them supply a proper kind of combination fixture, wherein both gas add electricity were placed to good advantage. This was in houses where combination fixtures were specified by the architect. There was a tendency on the part of some of the fixture manufacturers to push straight electric fixtures wherever possible, and in all probability they would eventually come to the point where a proper combination fixture would be sold. They believed, of course, in selling gas fixtures exclusively where they meet the demand of the consumer, for lighting fixtures, and would endeavor to convince all prospects that there could be furnished an artistic gas fixture that would meet every requirement. He hoped to see all gas companies at least exhibit in their offices and showrooms the best, as well as the most artistic, gas fixtures, modern in every way, for the influence of one company was often felt by a company probably 1,000 miles away. There was no question that thousands of combination fixtures were installed in houses far from satisfactory, from either the gas or electric standpoint. They had many, many instances in the residence lighting campaign the Company was now carrying on, whereby consumers who wanted incandescent gas lights could not get them, the representatives refusing to sell them lights on the ground that their installing would not have given the consumer satisfaction, because of the construction of the fixture. They should remember there are thousands of people who have used gas for lighting, and it was their duty to see that they could use gas for lighting should a change in residence occur. It was well the paper had been presented to the Association, and if it received the thought that it should they would, no doubt, even witness an improvement in gas fixtures.

Mr. Ummach declared there was not very much to add to what was said in the paper, only he thought this was the psycological moment for the commercial men of the gas companies to see that more gas fixture men belonged to the National Commercial Gas Association as active members. [Applause.] They had interested the stove manufacturers who were right on the job. They had exhibits there that cost them a great deal of money. They exhibit their goods and we criticized them. They were not only criticized one way, but a committee is appointed to draft specifications telling what was expected of them. The gas fixture manufacturers should be compelled to attend some of these meetings when they could be told what was expected of them, and how each could help the other. They might as well have interchangeable fittings, or ones that would do as well for Denver as for Chicago or New York. There was no reason for a different kind of fitting. As long as it is well made and would stand a certain amount of air pressure—a well-ground cock. As far as other elements of construction of the fixtures were concerned, these were merely individual ideas, either from a decorative or a practical standpoint, and he, for one, who had attended most all of the meetings, was willing to attend meetings from now on, to be told as to what was expected from him. [Applause.]

(To be Continued.)

Items of Interest
FROM VARIOUS LOCALITIES.

THE Fitchburg (Mass.) Gas and Electric Company has applied to the Board of Gas and Electric Light Commissioners for permission to make an issue of new stock, amounting at par to $32,250, the proceeds therefrom to be applied to the purchase of the property of the Wanoosnoc Power Company.

"T. G. M.," writing from Burlington, Vt., under date of the 5th inst., incloses this mention: "Early last spring a party named Joseph White came into prominence here through entering suit against the corporation which operates the Hotel Vermont. He claimed that while working on the building he received injuries that unfitted him for some time from any active pursuit. Evidently this inability to labor did not dull his ingenuity, particularly when such was likely to benefit his household, even if such benefit was obtained at the expense of another. He lives in a house on Walnut street, which premises was piped for gas, taken from the mains of the Burlington Light and Power Company. White had formerly worked for the named Company, and was quite proficient with the tools used in and about making meter connections. An inspector of the Company, noticing gas was being used on the premises, and also knowing that the meter had been removed quite a while back, visited the premises, unannounced, and at a time when White was not 'at home.' Making his way to the cellar he found that the service pipe had been connected direct to a riser without any intervening meter, and that the pipe extended to a gas range in the kitchen, which was on the second floor of the house. The cellar pipe was rather poorly concealed by a covering of empty meal bags. Later on, under a court order, White was arrested, charged with the larceny of gas, which is rather an expensive operation in this State, for it is provided that a person who knowingly uses gas which has not passed through a meter, or connects up the pipes so that gas may be used, without any registering thereof, is liable to a fine of $100, or a year's imprisonment, or both."

MR. L. B. JOHNS, at one time commercial manager for the Ithaca (N. Y.) Company, and who later on engaged as salesman with a manufacturing concern prominent in the gas range trade, has gone to Tampa, Fla., there to manage the affairs of a Boston concern largely interested in real estate in Florida.

AT a meeting of the Freeholders' Improvement Association, Avalon, Cal., a movement favoring the plan of installing a gas plant was given serious and extended consideration. Those who favored the project were emphatic in declaring that the frequent (if not to say promiscuous) use of gasoline had caused insurance companies to demand fees ranging from 10 to 20 per cent. of the valuation on all properties so protected, whereas the carrying on of a gas plant would cause those fees to rule at 6 per cent., or even less.

THE new pension plan arranged for its employees by the Consolidated Gas, Electric Light and Power Company, of Baltimore, Md., became effective the 1st inst. Its provisions were fully noted in the JOURNAL a short time ago.

AT the annual meeting of the Lincoln (Neb.) Gas and Electric Light Company the Directors chosen were: H. L. Doherty, Frank W. Frueauff, K. M. Joyce, Homer Honeywell, S. H. Burnham, E. B. Stephenson, Will. Raymond, L. E. Wettling and B. C. Adams. The only change in the Board is the replacing of Mr. Mahoney by Mr. Raymond.

MR. J. FRED. SHAFFER, acting for himself and Messrs. G. W. Beck and George Parkman, will apply to the Governor of Pennsylvania for the right to operate the Selinsgrove Gas Company, which proposes to supply gas for heat and fuel to the inhabitants of Selinsgrove, Penn and Monroe County, Pa. On the same date the same parties will apply to the Governor for the right to operate a plant for the supplying of gas for lighting purposes only to the residents of the communities before named. The name of the corporation is to be the Selinsgrove Gas Light Company.

"W. W.," writing from Regina, British Columbia, under date of the 1st inst., says that Mayor Armstrong, of Edmonton, is his author-

ity for stating that attention is to be given forthwi h to the app ointing of a gas engineer, in accordance with the ordinance adopted last fall directing that a gas plant, to be operated on municipal account, be constructed. On November 30th the time for receiving applications for the position of City Gas Engineer, expired, and the City Engineer has compiled the numerous applications received, and the compilation was filed early in December with the Commissioners. To be in readiness for the prosecution of the work, it is now appropriately urged that an engineer should be immediately retained to draw plans, etc., in order that proposals for plant, etc., may be made on which constructors of such plants may be asked for bids, etc.

AT the annual meeting of the Chambersburg (Pa.) Gas Company the following Directors were re-elected: Thos. B. Kennedy, I. C. Elder, T. M. Nelson, M. C. Kennedy, W. K. Sharpe and Geo. H. Stewart.

MR. S. H. WALLACE, who was recentl y appointed Assistant General Manager of the Suburban Electric Light and Power Company, and of the St. Louis County Gas Company, both of St. Louis, Mo., has named Mr. G. H. Neely as Manager of the former, and Mr. H. E. Wolff as Manager of the latter. It is proposed to extend the gas system to the districts of Ferguson, Overland Park and Newland Heights.

MENTIONING the above reminds us, too, that Mr. Einstein was tendered a "Reception and good fellowship meeting" at the regular luncheon of the St. Louis League of Electrical Interests, the scene of the festivities being in the rooms of the City Club; the date was the 2d inst. That the guiding spirits had planned better than they knew, seems proved from the fact that over a score had to find improvised seats. After the guest of honor had been presented by President H. H. Humphrey, of the League, he asserted that under the present conditions, a closer spirit of co-operation would mark the future relations between the public, the St. Louis League of Electrical Interests and the Union Electric Light and Power Company.

THE Los Angeles (Cal.) Gas and Electric Company has been authorized to maintain 3,200 electric arcs (the number in use last year), and an additional 500 lamps, to go into service forthwith, at the rate of $6.30 per lamp, per month.

AT the annual meeting of the shareholders in the St. Albans (Vt.) Gas Light Company the following Directors were elected: Lee S. Tillotson, M. M. Maynard, M. A. Flagg, E. K. Dunbar and L. A. Wheeler.

THE Standard Gas Light Company, a subsidiary of the New York Consolidated Gas Company, has purchased a plot on 115th to 116th street, East. The frontage thus secured covers 150 feet, and gives the Company 525 feet on 115th and a frontage of 606 feet on 116th.

THE Committee on Light, Richmond (Va.) City Council, has recommended that the salary of the offlcial gas inspector be put at $2,200. It is now $1,750. The framer of the amendment to the Richmond gas ordinance chapters is Ald. Jno. J. Mitchell, and while it is undoubtedly a move in the right direction, it nevertheless seems to us that the step proposed does not cover sufficient ground. If the work done by the present inspector (Mr. Joseph M. Shelton) is not worth $2,500 per annum, it is not worth anything. And that it is worth more than he is getting is to our minds a certainty. Then, too, the authorities should keep in mind the fact that the work that comes his way in the twelvemonth is increasing out of all ratio to the increases that were being experienced when Mr. Shelton was first appointed.

THE last "Bulletin" issued by the Gas Machinery Company, of Cleveland, O. (its "Form" is No. 328), has to do with that simple and never-failing instrument, the Pelouze & Audouin tar extractor. The Machinery folks have put the instrument on such advanced construction lines that, for instances, outputs in excess of 300,000 cubic feet per diem are readily taken care of through the operation of a special device patented by the Company in 1906. Write to them for a copy of this latest "Bulletin."

SOME of the authorities of Newburyport, Mass., are anxious to purchase the plants of the Newburyport Gas and Electric Company, for operation on municipal account, but others of them are opposing the project, on the ground that the city is not ready, in its position, to expend the sum necessary for its taking over.

THE Buzzards' Bay (Mass.) Electric Company has petitioned for the right to take up the business of manufacturing and distributing gas in the town of Barnstable.

"W. W. S.," writing from Springfield, Mass., under date of the 6th inst., forwards the following: "On the evening of the 2d inst., 34 of the staff and linemen of the Springfield Gas Company sat in to dinner, served in the Hotel Kimball, the purport of which was to welcome the New Year and to honor some of the men whose service to the corporation was the lengthiest. When tables had been cleared of the finishing traces of a most excellent meal, the toastmaster introduced several speakers, prominent amongst whom was President Charles H. Tenney, whose speech was concise, in that he had to make a train. He congratulated the officers and men over the good results of their meritorious service, expressed the hope that 1912 would be the greatest year in their joint history, and assured the men that their services were appreciated to the full. Supt. Benjamin P. Bill congratulated his men over their faithfulness and good work, and he also was positive that the time was at hand when they should get together and form a club, thus enabling the members to meet each other in terms promoting interchange of experiences while gaining better acquaintanceship; clever speeches were made by sever al department foremen, and the session was an enjoyable one in respect of time, manner and place."

THE Massachusetts Supreme Court finds, in the case of C. J. Gibney *vs* the Amesbury and Salisbury Gas Company, on appeal, that Gibney must pay the ve rdict of $5 against him in the suit originally brought by the Company. Gibney owned 2 houses on Salisbury Beach which were supplied with gas from prepayment meters. It was agreed that if the occupants did not use during the year, gas amounting in value to $7, he must make up the amount by contributing $7 additional on account of each meter. Gibney claimed the Company did not furnish gas all the year, but only in the summer time, and that often, at other seasons, on visiting the cottages, he was unable to obtain gas. He further claimed that he did not owe for 2 years under this system in any event, in that the clause was not made the first season in time to allow him to take advantage of it. A jury in the first instance decided that he owed the Company $5, and it was from that verdict the appeal was taken."

MR. JAMES AUSTIN has accepted a position on the works' staff of the Flemington (N. J.) Gas Company.

THE American Gas Company is said to have secured control of the gas and electric lighting plants of Elw ood, Ind.

THE Worcester (Mass.) Gas Light Company has intrusted to the care and direction of General Manager Dana D. Barnum, the converting of the top floor of the Company's building on Main street to the proper maintaining of an ind ustrial laboratory, modeled after the plan so successfully put in operation this year by the New York Consolidated Gas Company.

AT the annual meeting of the Tampa (Fla.) Gas Company the following Directors were elected: John J. Gribbel, D. J. Collins and Peter O. Knight. The projected improvements have all been reduced to a planned basis, and much good work under the scheme is being vigorously prosecuted.

"B. B. R.," writing to us from New Orleans, La., under date of the 4th inst., says: "I suppose, even though it must seem a trifle long after the feast, this little story will not come altogether amiss. However, whether acceptable or not, I send it to you: Santa Claus, paid a visit to the New Orleans Gas Light Company the evening of Saturday, the 23d prox., and entered unannounced the office of Mr. Chas. D. Armstrong, Commercial Manager. On the pretext that someone wanted to see him, he was conducted into the salesroom, where Brother George Simpson, of the soliciting force, presented him with a magnificent diamond-studded Elks' pin. The recipient, taken completely by surprise, plainly showed his confusion, but in time managed to fittingly respond. Thanking the donors for the sentiments expressed, he declared it was his habit and nature to maintain friendly relations between himself and those around him, and concluded his acknowledgment by remarking that they would always get on well, by getting together and pushing. A fitting wind-up or sequel to the Armstrong presentation was a pleasant remembrance to the head salesman, Mr. Chas. B. Bernios, whose token was in the nature of a well-adorned pair of gold cuff buttons. Mr. H. S. Graham and Miss. E. H. Klopper shared in the presentings."

COL. THERON E. PARSONS, a veteran of the Civil War, and son of the late Mr. George W. Parsons, for sev eral years Superintendent of the Rochester (N. Y.) Gas Light Com pany, died at his home in New York city, the night of the 6th inst. He was born in Rochester, April 4, 1842, served in the Civil War for 3 years in the 108th N. Y., and always kept up his affiliation through the G. A. R. In 1885 he joined the forces of the New York Life Insurance Company, in which branch of trade he was gener ally known and respected.

The Market for Gas Securities.

Well, some of the men went out on strike at 7 A.M. to-day. A "called meeting" was held in the "Labor Temple," which surely must be noted for its sacrificial altars. There were 54 men present, and the proposition to "on with the strike" was carried by a single voter. With a temperature away below the freezing point, and with the snow flying through the air, 'tis altogether typical of Puck's wail, "What fools these mortals be!" The first plants to be affected are those of the old Equitable (66th and East river), the Central Union at Locust avenue, and the main shop at Astoria, Long Island. The main (if not the only) contention is non-recognition of the Union. Meanwhile the shares of the Company were quoted at the opening to-day (Friday) at 141¾ to 142—a slight increase over the figures of last week.

Brooklyn Union is 2 points over the last quotations. In general the figures all round for gas shares are notably better than those reported for the closing week of 1911.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JANUARY 15.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	141⅝	2
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	8,000,000	1,000	103	1?6
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,600,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101⅛
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	85	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98¼	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	60	70
Preferred	5,000,000	100	90	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	138¼	142
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅛	⅜
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	29,500,000	100	87	90
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—	—	—
Mortgages, 5's	3,400,000	—	—	—
General Mortgage 4's	10,661,000	—	—	—
Con. Gas Co., Baltimore City, 4½	2,751,000	—	—	—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	14	96
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	65	67
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100¼
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	123	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,250,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	130	138
" Bonds, 5's	10,500,000	—	101	106
Indianapolis	2,000,000	—	—	38
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	88	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	106½	106¾
Preferred	2,500,000	100	114	120
Bonds	10,000,000	1,000	102¾	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91¼	91⅜
Preferred	25,000,000	100	94	94¼
Montreal Gas Co., Canada	9,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	5,000,000	—	127	128
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	103¼	104
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
acific Gas and Electric Co.	15,500,000	—	5 ⅜	55
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	439	440
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 16 to 18, 1912. Atlantic City, N. J. Officers: President, Ira C. Copley, Aurora, Ills. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, ———— Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.— nnual meeting, New York City, Oct. 1912. Officers: President, R. M. Searle, Rochester, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1912. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, 1912, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Sept. ————1912, ———— Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, Albert J. Marshall, 16 East 40th street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, A. L. Eustice, 105 North Wabash avenue.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Palmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Lincoln, Neb. Officers: President, G. W. Clabaugh, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, Sept. 1912. Manhattan, Kas. Officers: President, B. F. Eyer, Manhattan, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. ————1912;———— Officers: President, F. W. Blowers, Kalamazoo, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1912. Atlanta, Ga. Officers: President, C. L. Holman, St. Louis, Mo.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May, 1912, Kansas City, Mo.; Officers: President, A. B. Macbeth, Independence, Kas. Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 14th and 15th, 1912 Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn, Belmar, N. J.

Ohio Gas Association.—Annual meeting, February 6 and 7, 1912, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Oklahoma Gas, Electric and Railway Association.—President, Noel R. Gascho, Alva Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. ————1912, ———— ——Officers: President, W. Baurhyte, Los Angeles, Cal.; Vice-President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Williamsport, Pa., April 8-10, 1912. Officers, President, C. W. Butterworth, Philadelphia, Pa; Secretary-Treasurer, William H. Merritt Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, Dec., 13, 1912; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 39th street, New York city.

Southern Gas Association.—Annual meeting, April 17-19, 1912, Jacksonville, Fla. Officers: President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1912; Houston, Tex. Officers: President, J. E. Carroll, Beaumont, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.